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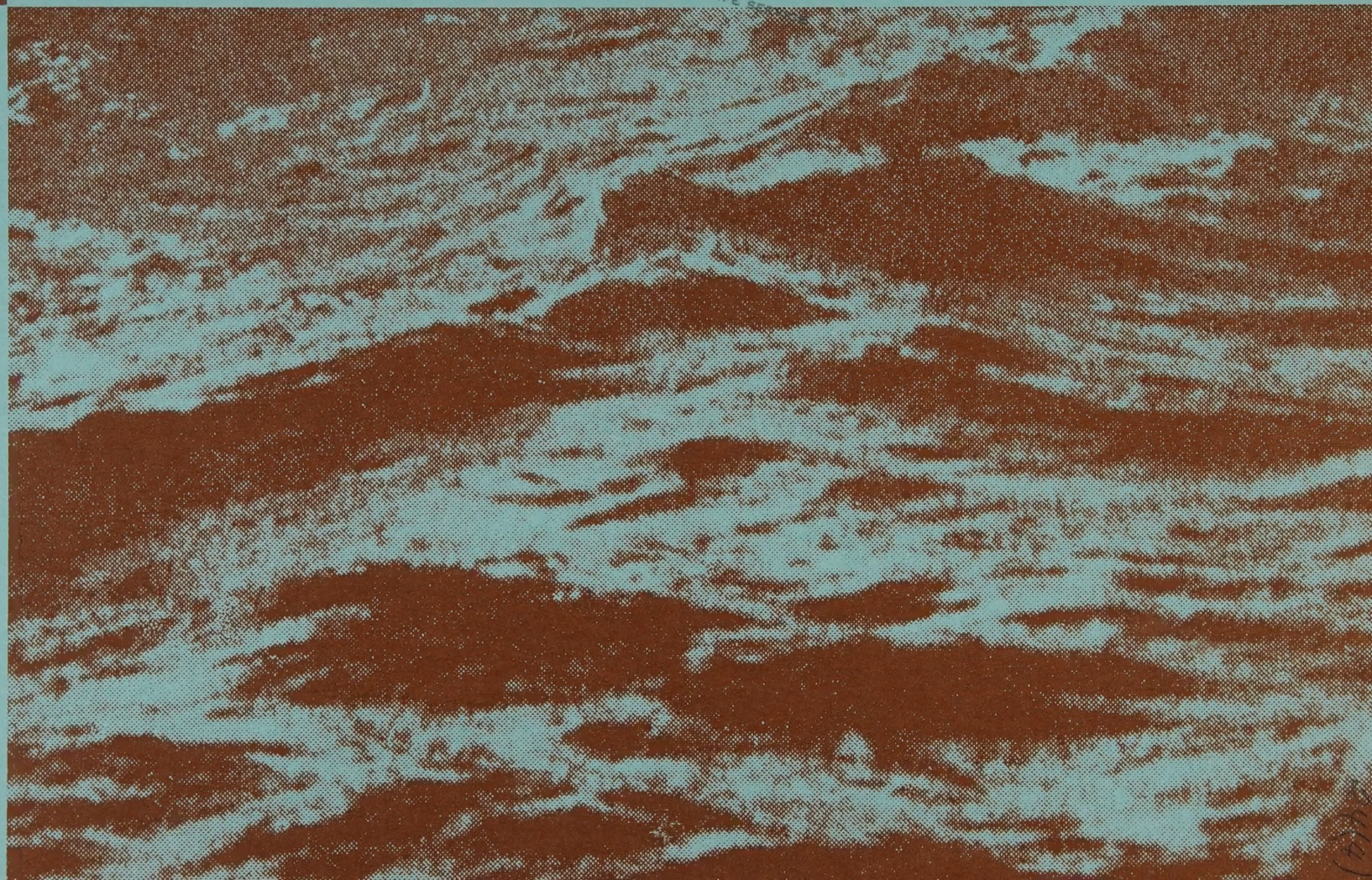

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Maurice H. Stans, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE FISHERIES SERVICE

Philip M. Roedel, *Director*

FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

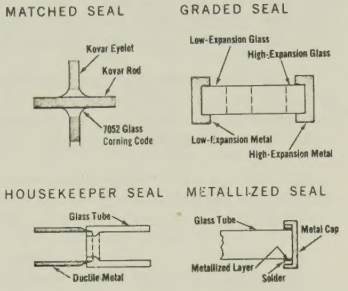
0.111 SOLDER GLASSES

Hogan, Raymond E. (Electronic Materials Department, Corning Glass Works, Corning, New York)
Chemical Technology (Chem Tech) 1, No. 1, 41-43 (January 1971) (American Chemical Society Publications Division, 1155 Sixteenth St., N.W., Washington, D.C. 20036)

Solder glasses melt at low temperature and are useful for sealing glass to glass, to metal, or to ceramic material. In this paper, the author defines the types of solder glasses, describes their uses, discusses sealing considerations, and mentions several different sealing techniques. Differential expansion tables are included that show at a glance the materials that make matching seals.

Apparently, sealing with solder glass is economical. Furthermore, if furnace controls are used and temperatures are minimized, consistently reliable, mass-produced seals are available for many new applications. The following figure shows four commonly used glass seals. [4 figures, 2 tables, 8 references]

COMMON GLASS SEALS



FTP

0.12 (3.336) INTRODUCES NEW-GENERATION PROCESSOR

Redfern, R. (Cherry-Burrell Corp., Chicago, Illinois)
Food Engineering 43, No. 1, 60-63 (January 1971)

This article describes a machine designed to serve as the center of a food-processing system. It consists of a stationary cylindrical bowl above a motor housing. It is driven through a central column by two dual-speed motors, one of which operates a mixing blade at either of two speeds and in either a clockwise or a counterclockwise direction; the other drives the planetary system, including a scraper assembly, in a clockwise direction. With the resulting eight mixing actions, ranging from fast high-shear to slow low-shear blending, a variety of materials can be amalgamated with a minimum degree of attrition. The whole operating area, with the exception of the central column (about 10% of the working surface), can be heated or cooled; if required, different temperatures can be maintained in separate parts of the machine. A special cover permits either pressure or vacuum processing.

This machine can be used for three types of processing--batch processing; continuous-batch, cyclic processing (in conjunction with other units of these machines); or continuous in-line processing (with available swivel-jointed, stainless steel, supply lines connected to inlet and outlet ports). In each type, the right weight of raw material (to an accuracy of 1 part in 1,000) is introduced in the right sequence and at the right time. It is then processed as required--defrosted, comminuted, mixed, homogenized, cooked, cooled, and/or evaporated--until the finished product is ready for discharge into packages or containers; no transfer to

(over)

0.119 (1.81)(9.12) UN DISPOSITIF SIMPLE PERMETTANT D'ÉTUDIER LE COMPORTEMENT DES HUITRES SOUS DES CONDITIONS EXPÉRIMENTALES OU DES CONDITIONS NATURELLES DE MILIEU
[A SIMPLE APPARATUS FOR STUDYING THE BEHAVIOR OF OYSTERS UNDER EXPERIMENTAL OR ENVIRONMENTAL CONDITIONS]

His, Edouard
Science et Pêche No. 196, 1-6 (October 1970) (In French)

Nutrition, respiration, and excretion of the oyster depend on the ciliary activity of the branchial epithelium and the action of the adductor muscle as a consequence of the opening and closing of the valves. According to Galtsoff, the lack of ability to flee makes contraction and relaxation of the muscle the only significant reactions the mollusk has for responding to either external or internal stimuli. Valvate movements, then, are a faithful indication of the oyster's reactions to environmental conditions. A record of these movements should demonstrate the influence of temperature, turbidity, tidal cycles, and pollution on the physiological behavior and functions of the oyster.

This report describes the simple, easily operated device used by the author to monitor the valvular movements of the European oyster (Ostrea edulis) and the Portuguese oyster (Crassostrea angulata). Briefly, it consists of a rotating drum of paper mounted on a platform above the subject. First the oyster is glued to a fixed support, such as a brick. Then a nylon thread is attached to the upper shell opposite the hinge. This thread leads to a horizontal writing arm that supports a pen. The tension on the thread is precisely adjusted to record any movement of the valve without disturbing the oyster's behavior. Displacement of the pen is governed by the position of the thread relative to the axis of the arm. A plastic

(over)

0.32 (0.35) STUDIES ON MYOFIBRILS FROM THE STORED MUSCLE. PART I. POST-MORTEM CHANGES IN ADENOSINE TRIPHOSPHATASE ACTIVITY OF MYOFIBRILS FROM RABBIT MUSCLE

Yang, Ryung, Akihiro Okitani, and Masao Fujimaki (Department of Agricultural Chemistry, University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 34, No. 12, 1765-1772 (December 1970)

The actual physicochemical changes that take place in muscle post mortem and that lead to tenderization are not yet known. Much of the available evidence seems to indicate that proteolysis is not the primary cause of postmortem tenderization of muscle. Most studies on the aging (the period during which tenderization takes place) of muscle have involved the molecular properties of the myofibrillar proteins. The present study was carried out to obtain further information on the biochemical changes in the actomyosin at the subcellular level during the storage of muscle by using the myofibril from prerigor, rigor, and postrigor muscle.

The longissimus dorsi muscle of the rabbit was used. The adenosine triphosphatase (ATPase) activity of the myofribils isolated from the fresh muscle and the muscle stored at 4° C. was measured. The chopped muscle was homogenized for 1 to 3 min. in a blender in one of four extracting solutions.

The greater the mechanical breakdown (longer period of homogenization) of the muscle, the greater the Mg-activated ATPase activity of myofibrils. The Mg-activated ATPase activity of the myofibrils increased as the muscle aged (stored at 4° C.)

When the myofibrils from prerigor and rigor muscle in 0.16 M KCl were treated with 0.6 M KCl-18 mM Tris-maleate solution (pH 7.0), the Mg-activated ATPase

(over)

0.114 (7.43) NEW METHOD FOR MEASURING DENSITY OF SEAWATER

Kremling, K. (Institute for Marine Research, Kiel, West Germany)
Nature 229, No. 5280, 109-110 (January 8, 1971)

Sea-water density is usually calculated from tables of the relation between salinity, temperature, and density. In the salinity range S‰ = 15-40, the tables give good results, but for water of low salinity, the variation of ionic relationships can cause discrepancies. A new system has been devised that determines density electronically. The results are accurate and the method is rapid. The apparatus consists of a hollow, glass, bending oscillator, 2 mm. in diameter, that is excited into undamped oscillation. When the oscillatory system is filled with a sample of sea water, the resonant frequency of the oscillator is influenced by the mass--and therefore the density--of the sample.
[1 figure, 9 references]

LB

0.12 (3.336)

other equipment is necessary. Among the applications mentioned by the author are vacuum cooking and cooling of meat, fish, vegetables, and fruit; continuous evaporation of highly viscous food products; and manufacture of sauces, creams, and food pastes of all kinds, particularly when they require heating and cooling treatments.
[4 figures] LB

0.116 MEMBRANE ULTRAFILTRATION APPLICATIONS IN FOOD PROCESSING.
1. PROCESS DESCRIPTION AND ECONOMICS

Porter, M. C. (Amicon Corp., Industrial Separations Department, Lexington, Massachussetts), and A. S. Michaels (Pharmetrics, Inc., Palo Alto, California)
Chemical Technology (Chem Tech) 1, No. 1, 56-63 (January 1971)

Membrane ultrafiltration (MUF) can separate low-molecular-weight materials from liquids containing high-molecular-weight materials. This article, the first of five, describes the process and compares it with competitive ones from an operability and economic viewpoint.

MUF [like reverse osmosis (RO)] is activated by hydraulic pressure and separates solution components by molecular size and shape. RO requires high operating pressures (500-2,000 p.s.i.); MUF does not (the operating pressures range between 5 and 100 p.s.i.). Because of this lower pressure, pumping and equipment costs for the MUF system are considerably lower.

The applications for ultrafiltration involve separations that can be accomplished by methods such as evaporation, drum drying, spray drying, freeze drying, freeze concentration, selective precipitation, dialysis, electrodialysis, gel filtration, or centrifugation. In subsequent articles, the authors will suggest specific applications for ultrafiltration in the food industry ranging from the recovery of proteins from cheese whey to membrane fermenters and reactors.
[14 figures, 2 tables, 19 references]

FTP

0.32 (0.35) CIRCULAR DICHROISM AND ELECTRON PARAMAGNETIC RESONANCE OF THE HAPTOGLOBIN-HEMOGLOBIN COMPLEX

Makinen, Marvin W., and Hideo Kon* (Laboratory of Physical Biology, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Maryland 20014) (*To whom to address correspondence)
Biochemistry 10, No. 1, 43-52 (January 5, 1971)

Haptoglobin (an α_2-globulin isolated from serum) binds hemoglobin, forming a complex of 1:1 stoichiometry and marked alteration of heme function with increased peroxidatic activity. The authors investigated this complex using a variety of spectroscopic methods to assess the influence of alterations in hemoglobin structure in changing the reactivity of the prosthetic group.
[8 figures, 1 table, 61 references]

FTP

0.32 (0.35)

activity of myofibrils at low ionic strength increased markedly. The Mg-activated ATPase activity of the myofibril isolated from the muscle stored at 4° C. for 8 days increased only slightly after a similar treatment.

The ATPase activity of the myofibril showed greater dependence upon the KCl concentration as the muscle aged.

The authors state that the results show that, as long as ATPase activity and the dependence of ATPase activity on KCl concentration are concerned, the myofibril isolated from muscle stored at 4° C. for 8 days is the most similar to the isolated actomyosin (although actomyosin in muscle may exist in a different form from that in solution). They suggest that the myofibril underwent structural alteration as the muscle aged (stored at 4° C.) and it (myofibril) became more susceptible to ATP-induced transformation. [8 figures, 31 references]

FTP

1.81 (9.19) A REVIEW OF POSSIBLE CAUSES OF MORTALITY OF OYSTER LARVAE OF THE GENUS CRASSOSTREA IN TOMALES BAY, CALIFORNIA

Berg, Carl J., Jr. (Pacific Marine Station, Dillon Beach, California)
California Fish and Game 57, No. 1, 69-75 (January 1971)

Oysters of the genus Crassostrea do not produce successive generations in Tomales Bay, California, because of the failure of the larvae to survive and set. Excessive turbidities, lack of proper food, and blooms of dinoflagellates are probably the major causes of oyster larvae mortality, although there are other contributing factors. [35 references]

Author's abstract

0.119 (1.81)(9.12)

tube surrounding the thread prevents distortion of the record by the action of wind or waves. The drum holding the paper is rotated by the movement of a clock's mechanism; it can be run for a week without refill. The height of the paper permits recordings of more than one subject to be made at a time. A transparent glass window permits continuous monitoring of the record. A removable cover protects the device when it is used out of doors. A thermograph alongside the subject measures the temperature of the water continuously; salinity and dissolved oxygen are determined at regular intervals.

The author has used the myograph to measure the limits of tolerance C. angulata demonstrates for different environmental factors. He has showed that this oyster is extremely sensitive to the accumulation of its own metabolic wastes. It registers such distinctive valvular activity under conditions of asphyxiation that he can recognize the symptoms of this type of intoxication. He has been able to precisely define its lower limits of tolerance for salinity. He has also been able, with a slowly revolving drum (22 mm./hour), to get traces characteristic of the egg-emitting process. [6 figures]

LB

0.320 DETERMINATION OF CARNOSINE, ANSERINE, AND BALENINE IN THE MUSCLE OF ANIMAL

Suyama, Michizo, Takeshi Suzuki, Michie Maruyama, and Kaoru Saito (Tokyo University of Fisheries, Konan, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 10, 1048-1053 (October 1970)

Carnosine (β-alanyl-histidine), along with its methylated derivatives anserine (β-alanyl-1-methylhistidine) and balenine (β-alanyl-3-methylhistidine), are known to occur in animal tissues. Nuclear magnetic resonance has proved that balenine and ophidine (erroneously reported as β-alanyl-2-methylhistidine) are identical. Although many data have been published on the isolation and assay of these compounds in animal tissues, knowledge about their distribution is wanting. To remedy the deficiency, the authors examined the distribution of the compounds in the flesh of fishes, shellfish, snakes, a snail, an echinoderm, and a chicken.

The authors used the chromatographic technique of Spackman et al. (1958) throughout--that is, a 0.9 × 50 cm. column of Amberlite IR-120. However, to improve the resolution of the compounds, they changed the pH value of the sodium citrate buffer (0.38 N) to 4.06 and elevated the temperature of the column to 50° C. They found no carnosine, anserine, or balenine in Pacific saury (Cololabis saira), Pacific mackerel (Scomber japonicus), flatfish (Kareius bicoloratus), takabe Labracoglossa argentiventris), shrimp (Metapenaeus joyneri and Penaeus orientalis), clams (Meretrix lusoria and Schizothaerus keenae), snail (Turbo [Batillus] cornutus), abalone (Haliotis gigantea), squid (Todarodes pacificus and Doryteuthis bleekeri), octopus (Octopus ocellatus), dogfish (Mustelus manazo), or sea cucumber (Stichopus japonicus). They did find one or more of these peptides in 22 of the fish species, as shown on back of card.

(over)

0.321 (1.92) PRELIMINARY STUDIES ON MUSCLE PROTEIN POLYMORPHISM OCCURRING WITHIN THE GENUS TILAPIA

Hines, R., and A. Yashouv (Fish Culture Research Station, Dor, Israel)
Bamidgeh 22, No. 3, 69-71 (September 1970)

Among some of the several related species of tilapia cultured in Israel, morphometric values, color, and habitat vary only slightly. Being able to distinguish the species by biochemical as well as morphological methods is desirable for both practical and taxonomic reasons. Therefore, the authors analyzed the electropherograms given by the muscle tissue extracts from six male fish of each of the following species: Tilapia aurea (from three geographic locations), T. volcani, T. zillii, T. mossambica, and T. galilaea.

The starch-gel electrophoretic patterns of T. aurea and T. volcani varied so slightly that additional study will be required to determine if the difference in their muscle myogens is significant enough to allow species differentiation. Although the morphological characteristics of T. aurea from the three geographical areas differed, their muscle protein patterns did not vary significantly. In contrast, the patterns of T. zillii, T. mossambica, and T. galilaea were quite distinct, permitting ready identification of each species.

[1 figure, 5 references] LB

Jeffries, H. Perry (Grad. Sch. of Oceanogr., Univ. of Rhode Island, Kingston, R.I.)
Chemical Abstracts 73, No. 25, 127975j (December 21, 1970)

0.31 SEASONAL COMPOSITION OF TEMPERATE PLANKTON COMMUNITIES: (0.39) FATTY ACIDS

0.322 (7.52) CHANGES IN FREE AMINO ACIDS DURING ASEPTIC AUTOLYSIS OF THE MUSCLE OF MACKEREL

Manita, Hideaki, Chiaki Koizumi, and Junsaku Nonaka (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 963-971 (September 1970)

Several researchers have studied the qualitative changes that occur in the free amino acids of fish muscle during the course of autolysis or during low temperature preservation. In 1962, Hoshino reported the quantitative changes he had determined by means of bioassay. However, the authors say, his results are questionable, since his aseptic treatment was faulty. In this paper, they report the quantitative changes they determined by gas-liquid chromatography.

First the amounts of free amino acids in the muscle of mackerel were determined by replicate GLC analyses. The results were quite similar; results obtained with an amino-acid autoanalyzer were, on the whole, slightly higher. Then the muscle of fresh mackerel was homogenized, and the homogenate was incubated at pH 3.5 and 45° C. After 0, 12, 24, and 48 hr., portions of the homogenate were analyzed. A table gives the changes that were evident in each amino acid after each incubation period. Hydroxyproline, which was not present at 0 hr., appeared in small amounts during autolysis.

(over)

0.38 LACTATE AND MALATE DEHYDROGENASE ISOZYME PATTERNS IN FISH AND MARINE ANIMALS

Numachi, Ken-ichi (Ocean Research Institute, University of Tokyo, Nakano, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 10, 1067-1077 (October 1970)

Lactate dehydrogenase (LDH) of fish has been studied by several workers. In 1965, Markert et al. reported that not only does fish LDH have isozymic forms but the electrophoretic patterns of the isozymes vary markedly between species. They suggested that, as in mammals and birds, the LDH isozymes of fish could be attributable to polymerization of two protein subunits under the control of two genes. In the following year, studies by Morrison et al. on the LDH of Salmonidae provided confirmatory evidence on the subunit structure and genetic control of LDH isozymes. Because knowledge about the molecular heterogeneity and genetic control of enzymes is useful for (1) studying evolutionary and taxonomical problems of fish, (2) analyzing fish populations (by using isozymes as well as blood groups in the determination of genotype from phenotype), and (3) clarifying the subtle regulation of metabolism and ecological behavior in fish species, the authors began a series of studies on the molecular heterogeneity in and the biological significance of fish enzymes. In this first study of the series, they show the marked species variation in the electrophoretic patterns of LDH and of malate dehydrogenase (MDH) in fish species. This variation is in striking contrast to the similarity they found in the isozyme patterns of marine mammals.

(over)

0.33 (8.8)

THE CURRENT STUDIES ON THE FRESHNESS OF FISH WITH SPECIAL REFERENCE TO NUCLEIC ACIDS AND THEIR RELATED COMPOUNDS

Uchiyama, Hitoshi, and Shigeo Ehira (Tokai Regional Fishery Research Laboratory, Kachidoki, Chuo-ku, Tokyo, Japan)

Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 977-992 (September 1970) (In Japanese)

This review article contains 6 figures and has 183 references. LB

0.38

PROTEOLYTIC ENZYMES IN SEA URCHIN EGGS: CHARACTERIZATION, LOCALIZATION, AND ACTIVITY BEFORE AND AFTER FERTILIZATION

Krischer, Kenneth N., and Edward L. Chambers (Dep. of Biochem., Univ. of Miami, Miami, Florida)

Chemical Abstracts 73, No. 21, 105700p (November 23, 1970)

0.39 (9.13)

TOTAL β-ACTIVITY OF OCEAN FISH

Todorov, Ivan, and Dobrin Bozhkov (Dist. Vet. Sta., Burgas, Bulgaria)

Chemical Abstracts 73, No. 25, 127461p (December 21, 1970)

0.38

The electrophoretic patterns given by the crude extracts from heart, lung, liver, and skeletal muscle of fur seal (Callorhinus ursinus), blue-white dolphin (Stenella caeruleo-alba), rough-toothed porpoise (Steno bredanensis), Dall's porpoise (Phocoenoides dalli), and True's porpoise (P. truei) were quite similar. All contained detectable amounts of five LDH isozymes; none contained other LDH isozymes. Although the quantitative distribution of the five isozymes in the various tissues differed somewhat, their mobility was identical.

In contrast, the patterns given by the crude extracts from the skeletal muscle of 39 species of fish varied considerably in both the number and the electrophoretic mobility of both LDH and MDH isozymes, as shown below.

Order	Number of species analyzed	No. of isozymes		Distance of migration (cm.)*	
		LDH	MDH	LDH	MDH
Clupeida	4	2-5	2-9	1.0	1.3
Cyprinida	1	3	9	0.6	1.5
Percida	23	2-9	2-6	0.4-1.3	1.1-1.7
Tetraodontida	4	1-2	3-7	0.4-0.7	1.3-1.7
Cottida	5	1-5	1-4	0.8-1.1	1.3-1.5
Pleuronectida	1	1	2	0.8	1.3
Lophiida	1	1	8	0.8	1.3

* Toward the anode of the most rapidly migrating isozyme present in the extract.

The genetic basis and the physiological meanings of the findings are discussed. [1 figure, 1 table, 2 plates, 11 references] LB

0.320

Fish species	Number of specimens	Amount (range) of peptide found (mg.%)		
		Carnosine	Anserine	Balenine
Whales: Balaenoptera physalus	4	103-140	2.8-5.0	1340-1520
Balaenoptera borealis	4	131-300	6.4-18.2	1560-1930
Balaenoptera acutorostrata	3	117-154	22.7-49.3	1700-1990
Physeter catodon	4	196-235	83.6-137	0.8-3.2
Globicephala melaena	2	227-275	37.5-39.0	515-590
Dolphin, Delphinus delphis	2	384-447	92.7-166	489-766
Harbor seal, Phoca viturina	2	511-592	118-150	0
Elasmobranchs: Glyphis glaucus	3	0	22.6-34.3	2.3-3.6
Carcharhinus longimanus	1	50.3	284	29.9
Isurus glaucus	1	0	872	2.9
Squalus mitsukurii	1	0.4	1010	0.3
Dasyatis akajei	1	0	2.3	0
Tunas: Tunnus obesus	2	0	859-1590	0-10.9
Thunnus albacares	1	9.5	1090	6.5
Thunnus alalunga	3	0-0.2	398-1570	0
Thunnus maccoyii	1	0	735	0
Sardine, Sardinops melanosticta	2	0	0.1-4.3	0
Horse mackerel, Trachurus japonicus	1	0	2.6	0
Eel, Anguilla japonica	1	542	0	0
Sea perch, Lateolabrax japonicus	1	0.1	0	0.4
Red sea bream, Pagrus major	1	0	1.8	0
Crab, Portunus trituberculatus	1	2.9	2.8	0

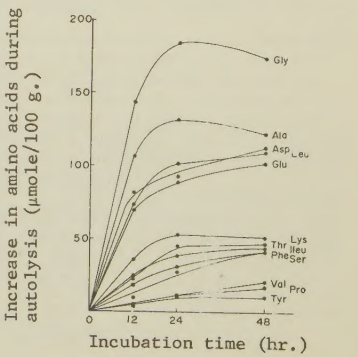
[1 figure, 3 tables, 7 references] LB

0.322 (7.52)

Amounts of free amino acids in mackerel muscle (mg. %)

Amino acid	Determined by	
	Average GLC	Ion exchange
Gly	6.09	4.54
Ala	12.2	14.9
Asp	5.62	---
Leu	3.05	3.14
Glu	18.3	15.3
Lys	20.3	18.0
Thr	4.41	5.63
Ileu	2.93	2.14
Phe	2.12	1.85
Ser	1.05	---
Val	3.82	3.46
Pro	---	1.83
Tyr	2.58	2.99
Met	2.57	2.31
His	---	892

Production rate of amino acids from mackerel muscle homogenate during aseptic autolysis



[5 figures, 4 tables, 7 references] LB

0.38 (7.591) STUDIES ON THE ESTERASE AND LIPASE OF FISH. III. ON THE ESTERASE AND LIPASE IN THE FISH MUSCLE

Morishita, Tatsuo, and Takashi Takahashi
Journal of Faculty of Fisheries, Prefectural University of Mie 8, No. 1, 41-51 (December 20, 1969) (In Japanese; figures, tables, and résumé in English)

The dark muscles of yellowtail (Seriola quinqueradiata), rainbow trout (Salmo gairdneri irideus), mackerel (Scomber japonicus), and stone flounder (Kareius bicoloratus) were separated from the lighter muscles, and the lighter muscles from the back of each species were divided lengthwise into five equal segments. The seven types of muscle (dark, lighter abdominal, and five sections of lighter dorsal muscle) were homogenized in cold water; the homogenates were used to determine enzymatic reaction. Substrates used were ß-naphthyl-acetate, ß-naphthyl-laurate, and ß-naphthyl-stearate. Optimum pH for hydrolysis of the substrates by the fish muscle extracts was determined at 30° C. for 20 min. on acetate and for 3 hr. on laurate and stearate; optimum temperature was determined by hydrolyzing each substrate at the optimum pH for 3 hr. at various temperatures.

Optima for hydrolysis of ß-naphthyl-esters by the esterase were pH 7 or 8 at 30° to 35° C. on acetate and pH 8 or 9 at 30° to 40° C. on laurate; by the lipase, about pH 5 at 30° to 40° C. on stearate and about pH 5 at 25° to 35° C. on laurate. Esterase and lipase activity varied with the muscle and the fish species--enzymatic activity of dark muscles being higher than that of the lighter muscles and esterase activity of the lighter abdominal muscles (except those of yellowtail) being higher than that of the other light muscles. In the segments of lighter

(over)

0.6 (8.9) VOLATILE FLAVORING SUBSTANCES IN FOODSTUFFS

Maier, Hans Gerhard (Institut für Lebensmittelchemie der Universität 6 Frankfurt/Main, Georg-Voigt-Strasse 16, Germany)
Angewandte Chemie (International Edition) 9, No. 12, 917-126 (December 1970)

The term "flavoring substance" as used in this report refers to the chemically definite compounds that cause the flavor of foodstuffs. The "threshold value" (limiting concentration--the lowest concentration of the substance at which its presence is recognized in comparison with a blank test) is influenced by other flavoring substances. For example, the odors of two flavoring substances may cancel each other out in suitable mixing ratios, or the odor of one component may be altered by other components having only a weak odor or no odor at all. Therefore, all volatile substances, with the exception of the odorless "permanent gases" and water, should be regarded as flavoring substances.

The odor of most foods is produced by mixtures of many volatile flavoring materials. The flavoring substances in living material are biosynthesized by widely differing routes. Microbial, enzymatic, oxidative, and thermal changes occur on death and during the storage and processing of the materials. The breakdown of fats and the Maillard reaction are particularly important to the formation of flavoring substances.

In this article the author discusses the general pathways for the formation of flavoring substances found in foodstuffs, the principal flavoring substances (aliphatic and alicyclic compounds, aromatic and heterocyclic compounds), the fixation of the flavoring substances, and the outlook.

(over)

0.39 (9.19)(9.13) DDT MOVEMENT FROM ADIPOCYTE TO MUSCLE CELL DURING LIPID UTILIZATION

Findlay, G. M., and A. S. W. deFreitas (Division of Biology, National Research Council of Canada, Ottawa 7, Canada)
Nature 229, No. 5279, 63-65 (January 1, 1971)

Numerous authors have suggested that the storage of DDT in the adipocyte lipids of birds and animals is an effective detoxifying mechanism for the pesticide. Storage in adipose tissue, however, is transient, since the release of DDT and its metabolites into the circulating fluids--normally a slow process--probably speeds up when lipid mobilization accelerates during periods of starvation or of activity. Many authors have demonstrated that starvation is followed by higher levels of DDT in the blood, altered concentrations of DDT in the tissues, and increased excretion of DDT by the animal. However, no one has quantitatively defined either the mobilization rate or the end state of the mobilized pesticide. The present authors quantify the amounts of DDT and its metabolites that are mobilized from adipose tissue and simultaneously accumulated in muscle tissue.

^{14}C DDT was dissolved in corn oil at concentrations of 0%, 0.15%, 1.5%, or 16%, and each solution was enclosed in gelatin capsules at a dose of about 64 mg. per capsule. Four groups of homing pigeons, 12 to a group, were force-fed two of the capsules a day for 16 days. The resulting amount of DDT ingested per bird was 0, 3.101, 32.07, or 335.0 mg. After dosing was completed, half the pigeons from each group were killed and the total body burden of DDT and its metabolites was determined. The other six pigeons in each group were caged individually at 6° C. with water but no food available. When each bird had lost between 18 and 20% of its original body weight (a condition that does not impair its ability to regain

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0.6 HEAVY ORGANIC CHEMICALS AND FOOD GROUPS

Anonymous ["A.F.M."]
Protein from Oil
G. H. Evans (Protein and Microbiological Research, British Petroleum Company)
Chemistry and Industry No. 50, 1597-1598 (December 12, 1970)

At a joint meeting of the Heavy Organic Chemicals Group and the Food Group of the Society of Chemical Industry (held November 17, 1970), Mr. Evans reported on the work British Petroleum (BP) has been doing in the production of protein from oil. He explained the requirements for cell growth when yeasts or bacteria are grown on a hydrocarbon substrate and discussed the efficiency (as measured by harvesting ease) of three fermentation processes. The resulting product--a "new, natural" protein, the lecturer emphasized, not a simulated, synthetic food--is from 60 to 70% protein; thus it is quite similar to fish meal or soya meal. It is produced much more quickly and is of a more consistent quality than are agricultural proteins; however, it is deficient in methionine and not, up to now, palatable to human consumers. In contrast, animals accept the product readily and, since it has been proved toxicologically harmless and nutritionally adequate for the needs of several generations of them, it becomes a source of dietary protein as economically produced as is agricultural protein. BP is operating several pilot plants in Great Britain, whereas in Japan the fermentation companies are producing this type of protein. LB

0.6 PHYSICAL PROPERTIES OF PLANT AND ANIMAL MATERIALS

Mohsenin, Huri N.
Gordon and Breach, New York (n.d.), volume 1, 734 pp. $24.50.
Chemical Engineering 78, No. 2, 117 (January 25, 1971)

This volume explores the physical laws that govern the responses of food materials to all the factors affecting them, from the production stage to the consumer. It describes the structure, the physical characteristics, and the mechnical properties of economic biomaterials and illustrates the application in the food industry of these data to the design of machines, the operation of processes, and the evaluation of quality. The biomaterials examined include grains, seeds, forage, silage, fruits, vegetables, meats, eggs, and dairy products. LB

0.6 (8.9)

Research on flavoring substances in foods is going in three directions: (1) analysis of flavors, (2) formation of the flavoring substances, and (3) fixation and alteration of flavoring substances.
[2 figures, 6 tables, 136 references] FTP

0.6 MEAT PRODUCT MANUFACTURE

Karmas, E.
Meat Product Manufacture, 270 pp. (1970) Noyes Data Corp., Park Ridge, New Jersey, Price $35.
Food Technology 25, No. 1, 87 (January 1971)

This is the second of a series of three reviews (in three volumes) on the manufacture of meat. The first volume was called "Fresh Meat Processing." The third volume will deal with the manufacture of sausage. The book describes 108 processes developed since 1960. The information is based on U.S. patents relating to the manufacture of meat. FTP

0.6 RHEOLOGY OF MINCED MEAT DURING CHOPPING (6.54)(0.12)

Gorbatow, A. W., and W. M. Gorbatow
Fleischwirtschaft 50, 297 (1970)
Food Manufacture 45, No. 10, 97 (October 1970)

A literature survey of mincing processes showed that (1) tests of meat-mincing equipment have been limited to calculations of energy consumption and (2) evaluation of the finished products, particularly of frankfurter-type sausages, has been restricted to organoleptic tests of quality, extreme values for stickiness and viscosity, and the ultimate yield stress of the emulsion after a given processing time. The authors report the quantitative results they obtained by using various chopping bowls, chopping times, and water concentrations. They stress the need for an objective, automatic instrument that can be used to determine the degree of doneness of the minced meat. LB

0.38 LYSOSOMAL CATHEPSINS OF CHICKEN SKELETAL MUSCLE: DISTRIBUTION AND PROPERTIES

Caldwell, Kathryn A., and Ok-koo K. Grosjean (Western Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Albany, California 94710)
Journal of Agricultural and Food Chemistry 19, No. 1, 108-111 (January-February 1971)

The experiments reported in this article were designed to characterize more definitely the catheptic [cathepsins are enzymes (mixtures of proteinases and peptidases) in living cells that have a hydrolytic action in living or dead animal tissues and a synthetic action in the living cell] activities present in skeletal muscle and to examine their cellular localization. The authors determined quantitatively the activities of cathepsins A, B, C, and D in extracts of chicken skeletal muscle by using synthetic peptides and denatured hemoglobin as substrates. They found that muscle cathepsins appear to be associated with the lysosomes. [3 figures, 6 tables, 13 references] FTP

0.38 (7.591)

dorsal muscles, both esterase and lipase activity decreased as the distance from the head increased--up to the segment nearest the tail, where the activity increased again. All the enzymatic activity measured in this study was markedly lower than that measured in earlier studies of esterolytic activity in fish organs.
[8 figures, 4 tables, 4 references] LB

0.39 (9.19)(9.13)

normal weight should food become available), it was killed; blood was collected and separated into plasma and erythrocytes; brain, liver, heart, the mental fat pad, and 10 g. of breast muscle were removed; and the remaining tissues were ground up together. Total lipid was extracted from each sample, and the ^{14}C content of the co-extracted DDT and its metabolites measured.

Starvation and cold did not change the percent of lipid or the net DDT content of erythrocytes, plasma, liver, or brain of the pigeons that ingested 32.07 mg. DDT. (The authors also measured and tabulated stress-induced changes in the other experimental birds.) The percent of lipid in the heart decreased, but no net change occurred in DDT content. During starvation, both the lipid and the DDT content of the omental fat pad decreased markedly; in contrast, the DDT content of the breast muscle increased, but the lipid content remained unchanged. The content and concentration per gram lipid increased in leg muscle as it did in breast muscle. These findings show that the principal changes in DDT content during starvation occur in adipocyte lipid and muscle tissue.

The increase in DDT content of total muscle during starvation was assumed to represent the net DDT movement into carcass muscle; the decrease in total carcass DDT to represent the amount of DDT irreversibly cleared from the system; and the sum of the two to give a minimum estimate of DDT mobilization from adipocyte lipid. The part of the mobilized DDT that was not cleared from the system was relocated only in the muscle. The authors suggest that the failure of the DDT to relocate in brain, liver, heart, or blood may be an important protective mechanism. Although DDT accumulation in muscle tissue could cause degenerative changes, it could also be harmless, since the DDT is probably located in the intracellular lipid droplets. [3 tables, 16 references] LB

0.6 STUDIES ON UTILIZATION OF AMINO ACIDS FOR FOODSTUFFS
(0.322)(6.54)

Miyake, Masato, Akiko Tanaka, and Ken Kawakami (Central Research Laboratories, Ajinomoto Co., Inc., Kawasaki, Japan, and Faculty of Fisheries, Prefectural University of Mie, Edobashi, Tsu, Mie Prefecture, Japan)
Report of Faculty of Fisheries, Prefectural University of Mie 6, No. 3, 159-168 (December 20, 1969)

III. EFFECTS OF BASIC AMINO ACIDS ON THE QUALITIES OF FROZEN FISH MEAT PASTE AND FISH MEAT SAUSAGE, pp. 159-163.

In 1966, Miyake et al. reported that the elasticity of kamaboko jelly is improved by addition of amino acids to the surimi (the minced fish that is the basic ingredient of kamaboko). They noted that the basic amino acids were particularly effective. In subsequent reports, they also noted the tenderizing and yield-improving effects of amino acids on canned meats. In the present report, they discuss the effect of arginine and lysine on the quality of frozen and fresh surimi.

Surimi prepared from Alaska pollock (Theragra chalcogrammus), horse mackerel (Trachurus japonicus), yellowfin tuna (Neothunnus albacares), black marlin (Makaira mazara), and shark (Isurus glaucus) were treated with various combinations of sugar, salt, and arginine and stored, along with untreated surimi, at -20° C. At varying periods throughout the year, samples of the frozen surimi were thawed, made into kamaboko, and tested for gel strength. Although the additive composed of 10% cane sugar, 3% common salt, and 1% arginine (each percentage being the ratio of preservative to amount of meat) was somewhat more effective in preventing denaturation of the protein than was the same additive with the sugar omitted, the authors recommend use of the latter because it does not introduce a sweet

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0.7 TOXICOLOGICAL EVALUATION OF SOME FOOD COLORS, EMULSIFIERS, STABILIZERS, ANTI-CAKING AGENTS, AND CERTAIN OTHER SUBSTANCES
(2.9)

Anonymous
FAO Report Series 46A, 161 pp. (1970) Unipub Inc., 650 First Avenue, New York N.Y. 10016, Price $1.00.
Food Technology 25, No. 1, 86 (January 1971)

The material in this book is the record of the deliberations of the Joint FAO/WHO Expert Committee on Food Additives (Rome, Italy, May 27-June 4, 1969). The book contains data on the toxicology of 77 food additives.

Information on each additive consists of biochemical aspects of toxicity, evaluation of acceptable levels of intake, and references for the data presented.

FTP

0.8 USEFUL ENERGY FROM UNWANTED HEAT
(9.19)

Bregman, J. I. (WAPORA Inc., 1725 DeSales St., N.W., Washington, D.C. 20036)
Chemical Engineering 78, No. 2, 83-87 (January 25, 1971)

The Federal Water Pollution Control Act is designed to protect our waters equally for all legitimate users. In other words, industry must not be allowed to introduce pollution that will destroy fish and wildlife nor must the standards set for the propagation of fish and wildlife be so restrictive that they destroy, or impose intolerable burdens upon, the industries that are co-users of the water. Basically four types of temperature standards must be met by water users: (1) the maximum-temperature value (the natural temperature of the water plus a small amount of artificial heat), (2) the temperature increase (the allowable rise in the temperature of water without the addition of artificial heat), (3) the rate of temperature increase (the increase in temperature within a given time; although this standard is functionally sound, since aquatic life is affected more by the rate than by the amount of temperature increase, it is not applied very often because it is very hard to monitor), and (4) the mixing zone (the zone in which hot effluent and the natural waters intermingle; temperatures are unrestricted in this zone--only the size and shape of the zone itself are defined). Because temperature standards are becoming more restrictive and more actively enforced, many firms that have delayed installing control systems will soon be pushed headlong into action. They may find that they must take the quickest approach to thermal control, not necessarily the most efficient, the most economical, or the most technologically innovative.

 (over)

0.8 MINIPLANT DESIGN AND USE

Cinadr, Bernard F., Jerome K. Curley, and Arthur T. Schooley (Chemical Engineering Department, B. F. Goodrich Research Center, 9921 Brecksville Road, Brecksville, Ohio 44141)
Chemical Engineering 78, No. 2, 62-76 (January 25, 1971)

A miniplant is the smallest scaled process system that will produce a product representative enough for meaningful evaluation and data accurate enough for use in the design and operation of a commercial-scale plant. In addition to the obvious economic reasons for building and operating a miniplant, there is yet another--since it is easier to build, operate, and revise than is a conventional pilot plant, new processes can be developed and tried in less time and at less cost.

This report is divided into three sections. In the introductory section, the authors discuss the basis for design, and the determination of function, scope, and size; the location and layout of the plant, housing, equipment design, construction materials, process piping, instrumentation and automation, waste disposal and pollution control; operating techniques and process flowsheets; personnel, safety and manpower requirements; cost and economic evaluation; and data collection and analysis. Tables are given comparing the advantages and disadvantages of miniplants relative to pilot plants and listing general rules for setting up a miniplant. In the section on selecting equipment, the authors cover process and mechanical considerations, electrical problems, overdesigning and equipment mismatch, and cyclic operation to correct mismatches. A table lists various types of miniplant equipment and the companies that manufacture each. The third section

 (over)

0.7 FOOD HABITS OF INFANTS AND PRESCHOOL CHILDREN IN SURINAM
(1.013)

Van Staveren, W. A., V. A. H. Tiggelman-Krugten, B. Ferrier, Ch. J. Maggillavry, and G. Dubois (Central Institute for Nutrition and Food Research TNO, Zeist, The Netherlands, and Ministry of Agriculture, Animal Husbandry, and Fisheries, Paramaribo, Surinam)

Journal of the American Dietetic Association 58, No. 2, 127-132 (February 1971)

Surinam is located on the northern coast of South America. It is one of the newer and developing countries in the Western Hemisphere. Little information is available on the food habits of infants and preschool children of this country and this article reports on a survey that provides such information.
[5 tables, 14 references] FTP

0.7 DIETARY REGULATIONS AND FOOD HABITS OF MUSLIMS

Sakr, Ahmad H. (Department of Chemistry, Slippery Rock State College, Slippery Rock, Pennsylvania)

Journal of the American Dietetic Association 58, No. 2, 123-126 (February 1971)

Because about 2,000,000 persons of Islamic faith live in the United States, the author, a Muslim, describes their dietary injunctions and regulations. This information should be a help to dietitians and others in planning dietary regimes or in serving and introducing food to persons of that faith. He reports some of the most important dietary regulations mentioned in the Holy Koran and the Sunnah of the Prophet Muhammad. Also, mentioned are the food habits of Muslims that have come through the teachings of Prophet Muhammad and his traditions. Finally, the author offers some applications of this information to pertinent situations in North America. [9 references] FTP

0.8

is a miniplant case history. The commercial plant that was built and operated on the basis of experience in the miniplant required only one minor piping change; starting operation was unusually smooth, since the installation behaved exactly as miniplant operation predicted it would. The only difference in the function of the two units was in the significantly higher efficiency of the production unit--a result of its superior materials-handling equipment.
[8 figures, 3 tables, 22 references] LB

0.8 THE DISPOSAL OF WASTES IN THE CHEMICAL INDUSTRY
(0.6)

Kolonics, Z. (Nitrokemia Ipertelepek, Hungary)
Kémikusok Lapja No. 5, 257-261 (1970) (In Magyar)

International Chemical Engineering 11, No. 1, 1-5 (January 1971) (a quarterly journal of translations from Russia, Eastern Europe, and Asia, published by the American Institute of Chemical Engineers, 345 East 47th Street, New York, N.Y. 10017)

This is a review type article that deals with the most efficient present day methods for the disposal of liquid-phase solvents and organic materials, solutions, resins and gels, organic and inorganic muds, dusts, and general wastes.
[7 figures, 10 references] FTP

0.6 (0.322)(6.54)

taste into the meat. They warn that when the alkalinity of the surimi is elevated, arginine will cause slight blackening of the product.

A Western-style meat sausage made of 40% whale meat, 30% yellowfin tuna, 5% black marlin, 5% shark, and 20% Alaska pollock surimi was treated with 0.2% lysine, stuffed into a casing, cooked for 60 min. at 85° C., cooled, and tested for quality. Gel strength, color, and taste were better than in the untreated control. Another Western-style sausage was made of yellowfin tuna and lard (10:1) to which either 0.2% or 0.5% lysine had been added. Gel strength increased as the percentage of lysine was increased; separation of fluids and fat from the sausage decreased; binding quality increased; and color improved.
[1 figure, 1 table, 5 references]

IV. AMINO ACIDS AS A MEAT EMULSIFYING AGENT, pp. 165-168.

In meat sausage, the protein and water form a matrix that encapsulates the fat, the meat emulsion having characteristics similar to those of an oil-water emulsion. Some emulsifying agent, then, is necessary. Some manufacturers use polyphosphates, which greatly enhance retention of fat and moisture in the cooked product. But phosphates may upset the nutritional equilibrium between calcium and phosphorus in the human body; they are known to discolor the product.

In this part of the report, the authors examine the effects of arginine on the quality of pork sausage; the effect of lysine on the quality of American-style frankfurters; and the effect of histidine, tryptophan, and methionine on the quality of sausage made from horse meat. In every instance, the addition of an amino acid to the sausage mixture improved gel strength, color, granular texture, and the ability of the sausage to retain its juices during cooking. In this last capacity, however, none of the amino acids was as effective as polyphosphate.
[2 tables, 2 references] LB

0.8 (9.19)

This article describes three presently used methods of dissipating heat generated by steam-electric plants, both fossil-fueled and nuclear-fueled: (1) once-through cooling, with either layer or mixed-jet discharge; (2) cooling impoundments, including those with spray systems; and (3) cooling towers, both wet (in which the temperature of the discharge is lowered by evaporation) and dry (in which the temperature is lowered by conduction and radiation), with air being moved either by natural draft or by mechanical draft. It covers the source of the cooling water, the amount of water required for different condenser flows and withdrawal rates, the physical and hydraulic characteristics of the effluent and the receiving water, the land or surface area required for heat transfer under various conditions, and the amount of dissipation achieved. It mentions auxiliary equipment required, and it details the advantages and disadvantages of each system (including the effect on environmental features other than water). Typical costs for each system when installed at fossil-fueled and nuclear-fueled steam-electric plants are tabulated.

The conclusion from all this analysis is that cooling towers, no matter how expensive, are the only present means of meeting temperature standards. In the future, however, more economically desirable approaches to thermal-pollution control will be taken. It is senseless, the author says, for one industry to spend millions of dollars dissipating energy while at the same time other industries are spending money acquiring it. The logical solution is to tie together industries that need energy and utilities that have an excess. Giant desalting units can be combined with nuclear-powered electric plants; satellite industrial and residential areas can be developed around power plants; or nuclear utilities can be made the center of industrial-residential-commercial-agricultural complexes where plants and animals are grown faster and in more abundance. Thus waste heat will be turned into a useful commodity, not a liability. [4 tables] LB

0.8 PUTTING SOUND-WAVES TO WORK
(0.6)(9.19)

Browning, Jon E. (Chemical Engineering, McGraw-Hill Building, 330 West 42nd St., New York, N.Y. 10036)
Chemical Engineering 78, No. 2, 32-34 (January 25, 1971)

The three basic means of producing a sonic wave are (1) with a static generator, or whistle; (2) by converting electrical energy into mechanical vibrations; and (3) with a dynamic generator, or rotary siren. The rotary siren has been used for several decades to agglomerate and remove airborne particulates, an application of particular significance in the control of air pollution. But the most promising and versatile of the wave-producing systems are the other two. Among the processing uses of sound energy that have been patented are those concerned with catalytic reactions, extraction of fats, reaction acceleration, organic chemical effects, and pickling. This article describes some of the sonic devices being studied, mentions their possible industrial application, and lists the research agencies developing and evaluating them.

The gas whistle directs compressed gas through a nozzle into a resonator cavity; the gas impinges against the lip of a resonator, causing the mass of gases contained in the cavity to vibrate; the waves from the resonator reflect off the nozzle face in a parabolic pattern. A patented variation of this classic device has proved particularly effective in improving combustion and controlling air pollution from oil burners. Other possible applications include deodorizing, evaporative cooling, flame spectroscopy, grain drying, humidification, catalyst reactivation, spray drying, smoke and dust suppression, and waste incineration.

The liquid whistle generates sound waves by impinging a high-velocity liquid stream on an obstacle. The resulting standing wave can be used to create cavitation, turbulence, or shear. Mixers using this system are suitable for a wide range

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1.011 FRESHWATER FISH -- POLLUTION BY INTRODUCTION
(9.19)(1.92)

Anonymous
Nature 229, No. 5281, 154 (January 15, 1971)

E. A. Lachner, C. R. Robins, and W. R. Courtenay, Jr., in Smithsonian Contributions to Zoology 59, No. 1 (1970), discuss the pollution of native North American biota by alien plants and animals. They point out that 25 nonnative species of fish have become established since their introduction into the United States and Canada. Some have been here for a long time. The brown trout, for example, was introduced in the 1880's; the carp in the 1830's. Both were officially sponsored as having food or sporting value. Yet today the carp is considered one of the most disastrous of all aquatic introductions--some states having to spend considerable amounts of money in an effort to control them.

A near relative, the Asiatic grass carp (Ctenopharyngodon idella), is being kept in ponds by many federal, state, and local agencies. Because of its voracious appetite for aquatic vegetation, it was supposed to be a "cheap" means of keeping waterways open. The authors conclude that its proliferation, particularly in the south, is a serious possibility and could lead to establishment of a pest even more harmful than the carp. They point out that the carp was introduced and protected in the early 1800's by the federal authorities, so the same sponsorship for the grass carp is no guarantee that its introduction will not prove to be expensive, also.

As for native trout, so-called fisheries management by introduction, transplantation, and hatchery interbreeding has effectively destroyed many of the west coast populations. Among the species now extinct are the emerald trout (Salmo smaragdus) of Pyramid Lake, Nevada, and the royal silver trout (Salmo regalis) of Lake Tahoe, on the border between California and Nevada.

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1.013 MARKETING AND CONSUMPTION OF FISH PRODUCTS IN BOGOTA
(2.6)(9.2)

Vergara G., Nizar E.
Estudios e Investigaciones, No. 4, 2 + 48 pp. (1970)

In the Prologue, Dr. Cristopher J. Molteno, who translated the original report, says:

"In Colombia it is generally recognized that fish is a valuable food whose consumption deserves to be encouraged in order to promote the level of nutrition within the country. However, what is restricting its utilization is not so much its abundance, since many thousands of tons are annually being dumped, as the fact that in getting it to the market its cost is raised to the point where it can no longer be bought by those who are most in need of it.

"Dr. Nizar Vergara in this comprehensive and worthwhile study of the marketing and consumption of fish and fish products in Bogotá has provided the reader with such information as channels of distribution, methods of transport, volumes of sales, marketing margins, seasonal demands, income-group preferences, and consumption levels. This information deserves to be carefully studied by those who may soon be concerned with organizing a marketing system which is designed to reduce distribution costs so that good quality fish can be sold to the lower income groups at reasonable prices."

The author's abstract reads as follows:

"The first part of this paper describes the principal aspects of the commercialization of fishery products in Bogotá, it includes suppliers, transported volumes, channels and marketing margins prices, wholesale and retail distribution.

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1.0145 SOVIET APPROACH TO CREW SAFETY
(2.117)(2.119)
(9.7)

Semyonov, Igor M. (Chief State Shipping Safety Inspectorate, Ministry of Fisheries, U.S.S.R.)
World Fishing 19, No. 11, 45-46, 49 (November 1970)

In Czarist Russia, commercial fishing was done only in rivers, lakes, and coastal seas and from sailing or row boats, small tugs or steamers. Thus when the Soviet state began to develop its sea fisheries, it could begin with a clean slate. Instead of copying the designs of fishing vessels used in countries whose fishing industries were developed, they created seagoing vessels designed not only for efficiency but for crew comfort and safety. This article describes some of the measures taken to ensure shipping safety and the safety of life at sea.

Every day more than 100,000 crewmen operate hundreds of Soviet trawlers and seiners and dozens of tender ships, floating factory ships, and refrigerator ships in the Atlantic, the Pacific, and the Indian Ocean. Every vessel is fully equipped for both radiotelephony and long-distance radiotelegraphy; each has at least one radio operator--the larger ships have several. Every vessel in a flotilla (and the entire Soviet fishing fleet is divided into flotillas, consisting of mother snips or factory ships with catcher boats, special rescue vessels, and sometimes research ships) must report its position, the fishing conditions in its area, and any need for assistance to the flagship every 4 hours. Aboard the flagships are expert consultants on navigation and machinery as well as skilled medical staffs to man the dispensaries and hospitals.

(over)

1.011 (9.19)(1.92)

However, the greatest biotic pollution in North America is in Florida. The authors describe that state as a biological cesspool of introduced life. Of the 57 species of alien vertebrates now established there, 10 are fish species. Several species of cichlid from South America and Africa are thriving at the expense of native fish. Some were released "to improve sport fishing"; others accidentally escaped from the aquaria of fish dealers. The Asiatic walking catfish (Clarias batrachus) is one of the latter. This fish grows rapidly, reproduces prolifically, maintains itself in dense populations, and distributes itself easily through waterways or overland. The authors note that a member of the Florida Game and Fresh Water Fish Commission reportedly has said that this fish is out of control and that no practical method of eradicating it is available. LB

[1 figure, 10 references]

Reprinted in part

[1 reference]

This paper describes briefly its decline and the results of the pacific mackerel research and geographic characteristics of the Pacific sardine only with the seasonal deposits of fishmeal and fish oil which dominate California's current commercial fisheries. Sardine and tuna landings were the largest in southern California waters, but the Pacific mackerel (Scomber japonicus) was until 1936 the third largest. This mackerel had declined until, in 1970, a 2-year moratorium was imposed by the California Legislature in an attempt to conserve the remainder of the resource and to assist in its recovery.

Reprinted in part

Kramer, David, and Paul E. Smith, 1970, a, b, c, Pacific mackerel (Scomber japonicus) in the California current region--IV. Pacific mackerel: Marine Fisheries Review, v. 32, No. 10, p. 47-69 (October 1970)

Commercial Fisheries Review, Vol. 32, No. 10 (October 1970)

Kramer, David, Paul E. Smith, and Marvin D. Mais (1970)

CALIFORNIA CURRENT REGION--IV. PACIFIC MACKEREL

SEASONAL AND GEOGRAPHIC CHARACTERISTICS OF FISHERY RESOURCES.

1.11 (1.0114)

0.8 (0.6)(9.19)

of continuous chemical reactions, including those occurring during food, paint, and textile processing. At least 65% of the business of one company that makes a liquid whistle is in the chemical processing industries--most of it homogenizers.

Converting electrical energy into mechanical vibrations requires (1) an electromechanical transducer, which converts electromechanical energy into high-frequency mechanical vibrations; (2) a coupling, which, rigidly attached to the transducer, converts the output to the motion required; and (3) a horn, which directs the sound waves to the desired point. With this system, similar or dissimilar metals or plastics can be fusion welded, rivets driven, and concrete mixed (the resulting product has a compressive strength 300% greater than that of conventionally mixed concrete). Other uses being investigated are friction reduction on a wide variety of cutting blades and accelerating the growth rate of bacteria. The key to this energy-conversion system is its use of a constant-frequency power source, which costs about $400/kw., rather than a variable-frequency power source, which costs about $2,000/kw.

Makers and marketers of sonic processing equipment have three common complaints: (1) the customer who comes shopping has not bothered to investigate how sound waves work, so he has to be educated before the seller can make any kind of meaningful demonstration of the equipment; (2) people who have had unpleasant experiences with the expensive, unreliable devices made when sonic technology was in its infancy refuse to believe that the technology has matured; and (3) most potential users think in terms of replacing an existing piece of hardware with sonic equipment rather than recognizing that, since the form of energy doing the work is being changed, the most economical approach to plant conversion is from a systems engineering standpoint. [2 tables]

LB

1.0145 (2.117)(2.119)(9.7)

Despite the complete line of electric and radio navigation facilities and equipment on board the vessels, safety at sea can be ensured only if the officers and men are adequately trained and supervised. To that end, 15 officer-training schools, with an enrollment of over 30,000, are operated in all big sea-fishing ports to provide instruction to navigators, ship's engineers, electrical engineers, chief radio officers, and refrigeration engineers. Only those officers who have had this training may hold command posts on seagoing trawlers. Before any captain can take his vessel to sea, the chief harbor master must certify that the required safety devices (fire-fighting equipment, inflatable vests, safety buoys, liferafts, and lifeboats and their provisions and equipment) are available and serviceable; that the ship is in complete technical order; that the established complement of men is on board; and that all ship's officers are qualified to hold their posts, as shown by their diplomas and sailing seniority. Each seaman is given a medical inspection to certify his fitness for work at sea. Once at sea, the ship and its crew may be inspected at any time of the day or night for their ability to respond to emergency situations and for their observance of established safety regulations (for example, the way the holds are loaded or the fish piled on deck). Men caught drinking alcoholic beverages are expelled from the fleet.

On most ships, seamen live two to a cabin. They are entitled to four free meals a day, served in spacious dining rooms and even during the night watches. Cooks are specially trained in the fishing ports. Since the seamen must work 7 days a week while at sea, they are entitled to 4 free days in port for every month they spend at sea. After 1 year, a seaman may take his annual paid leave, with his family, at a rest center or holiday resort. Several trawler fleet organizations operate their own hotels, rest homes, and sanitoria for seamen; these facilities are located in the southern areas of the Soviet Union. [5 photographs] LB

1.013 (2.6)(9.2)

"The second part shows sampling results of family fish consumption in Bogotá. The third part (Appendix) includes the methodology employed for preparing the sample and the way of estimating the principal variables."

[9 photographs, 2 diagrams, 19 tables, 1 appendix, a list of common and scientific names of commercial species of fishes, and a 9-point set of conclusions]

Reprinted in part

Separata de Divulgación Pesquera, No. 10, 5 (1970)] departmentally with Commercial Fisheries Abstracts No. 23, Vol. 1 [revised in Vol. 2 contained in Vol. 2.

These volumes, published for the Scientific Committee on Antarctic Research, contain 81 papers on all aspects of Antarctic ecology--descriptive, quantitative, behavioral, and functional. The papers are grouped into 14 categories; each has a short introduction, each is followed by an edited discussion, and many are illustrated with photographs, figures, and maps. Subject and author indexes are

1.01 (9.6) ANTARCTIC ECOSYSTEMS

New Plymouth, P. J. (reviewer) Antarctic Ecology, Volumes 1 and 2, xx + 690 pp. and 100s. Press:London and New York (1970), 120s. Academic

M. W. Holdgate (editor) Nature 229, No. 5282, 278-279 (January 22, 1971)

1.30 (9.12) THE CARRYING CAPACITY FOR JUVENILE SALMONIDS IN SOME NORTHERN CALIFORNIA STREAMS

Burns, James W. (Inland Fisheries Branch, California Department of Fish and Game)
California Fish and Game 57, No. 1, 44-57 (January 1971)

Standing crops of juvenile coho (silver) salmon (Oncorhynchus kisutch), steelhead rainbow trout (Salmo gairdneri), and coast cutthroat trout (Salmo clarki) were examined in seven coastal streams to define the natural carrying capacity of these streams, and to develop methods of population comparison and prediction which could be used to determine the effects of road construction and logging on salmon and trout production.

Biomass per unit of surface area was the best method of expressing carrying capacity, because biomass was better correlated with stream surface area than with other parameters tested. Volume of streambed sediments, total dissolved solids, alkalinity, and total phosphate in six streams were not satisfactory predictors of carrying capacity. Only living-space variables correlated significantly with biomass. Not all streams reached carrying capacity in the summer and salmonid biomass was highly variable. Even with 3 years of prelogging study, it would be difficult to attribute a change in carrying capacity under 50% to anything but natural variation. [10 tables, 25 references] Author's abstract

1.86 (2.15)(2.4) (9.15) RED CRAB, GERYON QUINQUEDENS
1) RECOMMENDED LIVE STORAGE TEMPERATURES
2) RESISTANCE TO GAFFKEMIA, THE LOBSTER DISEASE

Stewart, James E. (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia), and John W. Cornick
Fisheries Research Board of Canada New Series Circular No. 40, 2 pp. (December 16, 1970)

Following discovery of commercial quantities of red crab in the cold (40° to 41° F.) deep water along the edge of the Continental Shelf, the authors undertook to determine two essentials about this crab: (1) the maximum live storage temperature the crab could tolerate and (2) the susceptibility of the crab to the lobster disease gaffkemia, also known as blood disease or pink tail.

1. Vigorous, freshly caught red crabs were kept for 60 days in sea water ranging in temperature from 59° to 54° F. Within the first few days, about half the crabs died at 59°; 14% died at 57°; and 7% died at 54°. Although 54° is appreciably higher than the temperature of the crab's normal habitat (and even higher than the 50° F. apparent maximum for snow crab, Chionoectes opilio), the authors recommend that live red crabs be held in flowing sea water at this temperature, or at lower temperatures.

2. Red crabs injected with Gaffkya homari, which causes gaffkemia in lobsters, were unaffected by the bacterium. However, at the end of the 60-day test period, the bacterium could be reisolated from 40% of the crabs, and particularly from those kept at the higher temperatures. The authors conclude that although the red crab is resistant to gaffkemia, it could be a carrier.

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1.87 (2.15)(2.4) (9.15) DISEASE AMONG STORED LOBSTERS (GAFFKEMIA)

Stewart, James E. (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia), and John W. Cornick
Fisheries Research Board of Canada New Series Circular No. 41, 5 pp. (December 16, 1970)

Gaffkemia, the fatal bacterial infection of lobsters, is caused by Gaffkya homari. It affects only lobsters and certain species of crab--never, as far as is known, any other animal. A 1-lb. infected lobster will carry from 200 to 300 billion G. homari in its blood and tissues; a single drop of its blood can contain as many as 50 million G. homari, even one of which can cause fatal infection in another lobster. Since the disease increases the clotting time of the lobster's blood, an infected lobster can bleed to death if wounded; and even if not, it can become extremely weak and die within minutes of being removed from the water. A pin prick of a wound, or even a chewed antenna, is sufficient entryway for the bacterium. For these reasons, the authors recommend the following:

1. Handle lobsters carefully--avoid wounding.
2. Store only lobsters that are vigorous.
3. Use some method other than plugging to keep claws closed. (Although rubber bands do not cause wounds, they can slip off and leave the claw free for fighting. If they are used, they must be checked at regular intervals.)
4. If at all possible, keep lobsters from different areas separate.

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2.0 RIGOR TENSIONS AND GAPING IN COD MUSCLE

Burt, J. R., N. R. Jones, A. S. McGill, and G. D. Stroud (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Journal of Food Technology 5, No. 4, 339-351 (December 1970)

"Gaping" is a term applied to a phenomenon that occurs in the musculature of fish. It involves the development of holes or slits between the muscle segments (myotomes) of fish fillets as a result of the breakdown of the minute tubes of connective tissue that come from the connective tissue sheets (myocommata) and run between and around the muscle cells. From the standpoint of appearance and utility, fish fillets that show gaping are of inferior quality. The present study was part of a larger program to determine the origins and cause of gaping in fish. The information in this paper deals with the effects of temperature on the breaking stress of cod muscle fibers and of muscle connective-tissue systems and on the effects of temperature and anoxia on the development of rigor tension in cod muscle fibers.

The researchers found that the immediate cause of gaping in fillets cut from cod that have been accelerated into rigor mortis by high temperatures is a combination of the greater rigor tensions generated at higher temperatures and the lowering of the inherent strength of the tissues. These effects proceed to such an extent at higher temperatures (from about 20° upwards to 30° C.--the upper limit of the temperature range used) that the muscle literally pulls itself to pieces. The magnitudes of the rigor tensions produced at a given temperature were

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1.86 (2.15)(2.4)(9.15)

Information about red crab processing and plant layout can be obtained either from the Industrial Development Branch of the Department of Fisheries and Forestry or from the Fisheries Inspection Laboratory, Department of Fisheries and Forestry, Halifax, Nova Scotia.

The following technical reports (by S. Varga, A. B. Dewar, and W. E. Anderson of the Applied Research and Development Laboratory, Inspection Branch, Maritimes Region, Canada Department of Fisheries and Forestry, P.O. Box 550, Halifax, Nova Scotia) are also available:

No. 1 - Precooking required for red crab sections (October 1969)
No. 2 - Survival of red crabs held on ice and refrigerated air (December 1969)
No. 3 - Effect of post mortem spoilage on the quality of frozen and heat processed red crab meat (February 1970).

Additional publications of potential usefulness include:

1. The Commercial Potential of the Deep Sea Red Crab, by A. Holmsen (Depart- of Food and Resource Economics, College of Agriculture, University of Rhode Island, Kingston). Occasional paper 63-138 (1968).

2. Red Crabs in Your Future, by T. L. Meade (University of Rhode Island Agricultural Experiment Station, Cooperative Extension Service, Kingston). Rhode Island Resources 16, No. 1, 1-3 (1970).

3. Canadian Atlantic Crab Resources, by D. G. Wilder (Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick). General Series Circular No. 50 (September 1966). LB

2.0

similar whether or not the system was made anoxic. The change in lactate concentration between death of the fish and the onset of rigor mortis did not show any correlation with the tension developed.
[6 figures, 1 table, 28 references] FTP

2.3 (0.5) STAPHYLOCOCCI CONTROL AND THE FOOD PROCESSOR

De Figueiredo, Mario P. (Kitchens of Sara Lee, Deerfield, Illinois)
Journal of the American Dietetic Association 58, No. 2, 109-114 (February 1971)

The author discusses the significance of staphylococci in foods and the preventive measures that might be taken to prevent staphylococcal food poisoning. He believes that the staphylococci problem is just as important as the salmonella problem, and he refers to a recent report issued by the National Academy of Sciences (Washington, D.C.) entitled "Evaluation of Salmonella Problem," Publication No. 1683 (1969). [2 tables, 33 references] FTP

1.85 (1.01111) (1.0115) LA CREVETTE PROFONDE (PANDALUS BOREALIS) DANS LA REGION DU NORD-OUEST ATLANTIQUE [THE DEEP-SEA PRAWN (PANDALUS BOREALIS) IN THE NORTHWEST ATLANTIC]

Fontaine, Bernard
Science et Pêche, No. 197, 16 pp. (November 1970) (In French)

This report has the following sections:

Distribution - along the southern coast of Labrador and the north-northeast coast of Newfoundland, in the Gulf of St. Lawrence, along the southern coast of Newfoundland and in the St. Lawrence channel, along the coasts of Nova Scotia.

Factors affecting distribution - the nature of the bottom (they occur only on muddy bottoms, never on rocky, gravelly, or coarse sandy bottoms) and the temperature (-1° C. to 14° C., with the optimum being about 8° C.); depth is of no consequence.

Biology of deep-sea prawns in relation to the fishery - size, weight, reproductive capacity, migrations.

The deep-sea-prawn fishery - existing fisheries (their location), gear used, yield (by geographical area), fishes taken along with prawn.

Handling of deep-sea prawns - on board ship, on land.

[7 figures] LB

1.87 (2.15)(2.4)(9.15)

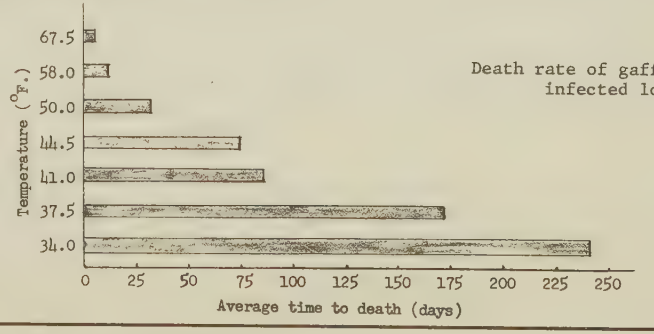
5. Dispose of dead lobsters by incineration if possible. (Disposing of infected lobsters at sea or along the shore helps perpetuate the disease.)

6. Inspect holding tanks frequently, and immediately remove weak lobsters before cannibalism begins.

7. Scrub and disinfect holding tanks regularly--and especially after an outbreak of gaffkemia. (See procedures suggested in New Series Circular No. 42.)

8. Make sure that the water inlet is as far as possible from the wastewater outlet.

9. Keep water temperatures as low as possible--ideally, at 34° F. (See accompanying figure.) [1 figure]



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2.01 (0.5) THE BACTERIOLOGY OF 'SCAMPI' (NEPHROPS NORVEGICUS). I. PRELIMINARY BACTERIOLOGICAL, CHEMICAL AND SENSORY STUDIES

Walker, P., D. Cann, and J. M. Shewan (Ministry of Technology, Torry Research Station, Aberdeen, Scotland)
Journal of Food Technology 5, No. 4, 375-385 (December 1970)

'Scampi' (shrimp) are also known as Norway lobster or Dublin Bay prawn. This study was carried out to obtain some information of the factors affecting the keeping quality of scampi after they are landed that would lead to improved handling and storage on ship and shore. Consequently, a study was made of the bacterial flora of fresh scampi and of flora of the scampi stored at ice temperature. Also, sensory evaluations of and chemical analyses for the types and amounts of loss in the fresh and stored scampi were made.

Lots of freshly landed headless scampi were collected at three ports in Scotland. At the laboratory, samples were immediately taken for bacteriological, chemical, and sensory analysis. The remainder of each lot was stored unshelled with or without ice in a chill room at 2.2° C. Samples for analysis were taken after 2, 4, 6, 8, 10, or 12 days of storage (until they were judged inedible by the taste panel). Bacteria counts were made at 20° C. and 37° C. incubation temperatures.

The scampi became inedible after 8-10 days of storage due to the presence of strong, ammoniacal, sour odors and flavors. Bacteria counts of the scampi rose sharply after the fourth day of storage, reaching 10^6/g. of scampi at 20° C. and 10^4/g. at 37° C. at the end of the storage period. The initial flora consisted mainly of coryneforms, but the flora changed during storage of the scampi until it finally consisted mainly of Achromobacter species (70%).

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2.1121 (2.114) DUTCH TWIN BOOM TRAWLING

De Boer, E. J. (Technical Section, Dutch Fisheries Directorate)
World Fishing 19, No. 11, 38, 40-41, 49 (November 1970)

When Dutch shrimp trawlers began beam trawling for flatfish in the early 1960's, the size and propulsive power of their vessels limited the length of the beams to about 22 ft. But, since the area of seabed fished per unit of time increases as the beam length, or net opening, increases, and the catch per unit of seabed area fished is directly influenced by the weight per unit length of the tickler chains, the dimensions and propulsive power of the vessels have sharply and steadily increased. The current beam length is between 30 and 36 ft., and new vessels are being built with installed engine power ranging from 900 to 1,200 b.hp. Not only would longer beams be unmanageable, but both they and the spreading booms would have to be of very strong, heavy construction to withstand the additional bending and buckling forces such length would impose.

Although gear sizes are no longer increasing, the weight of the tickler chains continues to do so. The effect of these developments can be seen below.

Year trawler built	Engine horsepower	Length of beam	Weight of tickler, each groundrope	Total weight, each beam gear
	b.hp.	ft.	lb.	lb.
1967	540	28	1,452	3,784
1970	900	33	3,388	8,800

The author describes the rigging of beam gear and the rationale of the variations in its three main components--the trawlheads, the net, and the tickler

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2.1128 (1.85) MAINE AGENCY DRAWS PLANS FOR SHRIMP TRAPS

Rinaldo, Ronald G. (Maine Shrimp Research, Sea and Shore Fisheries Laboratory, West Boothbay Harbor, Maine), Paul M. W. Venno (Marine Fisheries Extension Service, Sea and Shore Fisheries, Augusta, Maine), Martin Brewer, Afton Farrin, and Donald Nelson
National Fisherman 51, No. 10, 16B-17B (February 1971)

Maine fishermen began using traps to catch shrimp during the 1969-1970 season. Because of the interest that has grown in this means of fishing, the authors made a survey of commercially available shrimp traps and developed a set of instructions for the step-by-step construction of two types of the trap. They also give the sources of any materials that may not be available from normal marine suppliers or hardware stores.

The half-round trap is 30 × 24 × 16 inches and can be made with either a single or a double head opening. Materials needed are pot stock for the frame, 16-gauge ½-in.-mesh aluminized wire, hog rings (the small wire rings used in hogs' ears or on car-seat upholstery) and special pliers, and ballast. Tools required are hammer, wire snips, and a bending brake or jig. This trap can be made in 2 or 3 hours; it costs about $6.50.

The square trap is 30 × 24 × 14 inches; it, too, can be made with single or double head opening. Materials needed are 16-gauge ½-in.-mesh aluminized wire, hog rings and pliers, aluminum clip rings and special pliers, and two bricks. Tools required are wire snips, diagonal wire cutters, bending brake or jig, and a

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2.12 (9.17) TRIALS WITH A TRANSPONDING ACOUSTIC FISH TAG TRACKED WITH AN ELECTRONIC SECTOR SCANNING SONAR

Walker, M. Greer, R. B. Mitson, and T. Storeton-West (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, Suffolk, England)
Nature 229, No. 5281, 196-198 (January 15, 1971)

The article begins with a description of the ARL scanner that has been installed aboard the Ministry of Agriculture's research vessel Clione. Details of the design and of the installation may be found in Ultrasonics 4, No. 1 (1966) and in the Proceedings of the IERE Conference on Electronic Engineering in Ocean Technology, held in Swansea in 1970.

Although both shoals and individual fish have been tracked with the scanner, a more positive means of identification and tracking was needed. Hence the authors developed a transponding system that can be attached to the fish. The system consists of a receiver and a transmitter operating at 300 kHz, the carrier frequency of the scanner. The signal received from the scanner is amplified and used to trigger a transmitter that is part of the fish tag. (The tag is to be described in another publication.) A 3-msec. pulse emitted from the tag returns to the scanner, where it is displayed as a bright triangle.

In a test of the acoustic tag, the authors tagged a 43-cm. plaice (Pleuronectes platessa L.) and released it in the southern part of the North Sea. They followed the fish from 10 a.m. until after midnight, when operator fatigue caused tracking to be halted. During all this time, they could maintain contact for distances of up to 365 m. When the fish was on the bottom, however (the area has

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2.3 SHRIMP PROCESSING

U.S. Patent 3,528,125
Jones, J. M., Jr.; General Tool Co. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

The apparatus and method are used to process freshly caught shrimp aboard the fishing vessel. FTP

2.3 SHELLFISH PROCESSING

U.S. Patent 3,528,124
Westrom, R. T., and T. S. Gorton, Jr. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

The patent covers a method and the equipment for shucking shellfish (bivalves). FTP

2.1128 (1.85)

flat-jawed vise having a jaw width of less than ¾ in. This trap can be made in 3 or 4 hours at a cost of about $7.80.

The article includes diagrams of component details for each trap and exploded views of the completed traps. [11 figures] LB

2.3 (9.19) INDUSTRIAL WASTES TREATMENT BY ACTIVATED SLUDGE. XVIII. TREATMENT OF WASTES FROM FISH MEAT MANUFACTURE

Dazai, M., M. Ogawa, and T. Misono
Rep. Ferment Res. Inst., No. 34, 11-18 (1968)
BFMIRA 24, No. 1, Abstract No. 231, 48 (January 1971)

Experiments indicated that treatment of wastes from fish processing by activated sludge showed that efficiency of the treatment increased as the sludge became adapted to the waste water. Reprinted

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2.3 FISH GUTTING APPARATUS

British Patent 1,197,435
Johannesson, R. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

Three coaxially spaced cutting disks are used to cut and eviscerate fish. FTP

2.01 (0.5)

Total volatile base (TVB) and trimethylamine (TMA) content of the flesh of the scampi increased during storage. Initial TVB content was 20 mg. N/100 g. flesh; final (after 10-12 days) TVB content was 70 mg. N/100 g. TMA content was 0.5 mg. N/100 g. flesh; final (after 10-12 days) TMA content was 20 mg. N/100 g. [8 tables, 15 references] FTP

2.5 (2.4)(2.15)(9.16) CONDITIONED WATER-HABITAT FOR SHIPPING AND KEEPING LIVE FISHES

Proewig, Frederick W. (Aquarium Import Corp.) (pat.)
U.S. Patent 3,522,793
Chemical Abstracts 73, No. 25, 128357w (December 21, 1970)

2.12 (9.17)

a uniform depth of about 27 m.), the signal was not always recognizable; the authors speculate that the fish may have been buried in the sand and gravel. Results of the fish's position at night--some 6.7 m. off the bottom rather than the 2 m. it normally kept during the day--coincided with the laboratory results reported by Verheijen and De Groot in 1967.

The authors conclude that, since this technique gives detailed information about the fish's depth, its position, and its relation to bottom features, the transponding acoustic fish tag can be used to study the reaction of fish to gear as well as to monitor their behavior and migration patterns.

[2 figures, 1 table, 9 references] LB

2.1112 LEAFLET IS AVAILABLE ON TRICKY JOB OF CUTTING WEB TAPES

Anonymous
National Fisherman 51, No. 10, 20B (February 1971)

Captain Geoffrey A. Motte, an assistant professor of fisheries and marine technology at the University of Rhode Island, has authored a leaflet giving commercial fishermen mathematical formulas for making two different types of net taper. The formulas apply to the body cut and the jib cut. They have been printed, the author says, to save fishermen time, material, and temper. The leaflet can be obtained by writing for "Cutting Web Tapers," Marine Advisory Service, 19 Upper College Road, University of Rhode Island, Kingston, R.I. 02881. LB

2.1121 (2.114)

chains. He goes into detail in describing the boom, warp, and gantry arrangements that reduce buckling forces, the capsizing moment, and lost fishing time; and he discusses the safety factors introduced by use of six- or eight-drum winches (the Dutch Inspector of Shipping requires four, two for the warps and two for the topping lifts). Abandonment of belt-driven winches (with dog clutches and a jockey pulley) powered from the main engine in favor of those with friction clutch, hydraulic or electric drive, and controls in the wheelhouse has greatly increased the skipper's control of the hauling operation. The Van Damme system of twin boom trawling incorporates both a fixed and a running topping lift, including a special lever device for reducing boom load when the gear is caught. On the latest twin boom trawlers, the winch is below decks, an arrangement designed to improve vessel stability. [12 figures] LB

2.3 BONE-FREE FISH FILLETS

U.S. Patent 3,525,120
Jobmann, P.; Nordischer Maschinenbau Rud (pat.)
Food Technology 25, No. 1, 56 (January 1971)

Fish fillets are produced that are free of pin bones. The fish is cut open and the belly flaps are severed from the back. FTP

2.3 FISH CLEANING APPARATUS

U.S. Patent 3,525,121
Elich, A.; Ralston Purina (pat.)
Food Technology 25, No. 1, 56 (January 1971)

The apparatus removes the head and viscera of fish. FTP

3.231 NEW WAY TO FABRICATE MEATS

Fenters, W. (Purveyors Meat Supply, Inc., Pennville, Indiana), and John V. Ziemba (Food Engineering, Chicago, Illinois)
Food Engineering 43, No. 1, 64-65 (January 1971)

With the technique described here, boneless meat, poultry, or fish is cut into flakes about the size and thickness of a fingernail. The flakes are then knit together in a blender, frozen, tempered, and machine-pressed into loaves. Subsequent slicing, dicing, or cutting into strips governs the ingredients added during blending: spices, seasonings, flavor potentiators, proteins, fats, textured soy protein, or meat cuts. The resulting product can be formed into a variety of shapes, and it can be tailored for texture, tenderness, and fat and protein level. The re-formed, portion-controlled meat will retain its shape during cooking--even the diced product will not fall apart when used in stews or casseroles.

The key component in the flaking process is a centrifugal cutter having a stationary cutting head and a high-speed, 3,600 r.p.m. impeller. The cutting head contains columns of precision-honed, vertical knives and uniformly spaced, thin, horizontal bars. The number of knives and the spacing of the bars determine the size and shape of the flaked product. The process works as follows: a screw conveyor feeds boneless meat from a hopper into the center of the cutter's revolving impeller; the meat is accelerated to high speed, impelled by centrifugal force into the cutting head, and then ejected. During flaking, heat rise and loss of juice are minimum. [3 photographs] LB

3.15 EFFECT OF γ-IRRADIATION ON BEEF MYOGLOBIN

Clarke, Reginald, and James F. Richards (Department of Food Science, University of British Columbia, Vancouver 8, B.C., Canada)
Journal of Agricultural and Food Chemistry 19, No. 1, 170-174 (January-February 1971)

The myoglobins are the heme-containing pigments responsible for the red color in meats. Earlier work has shown that the heme, as well as the protein moiety, of meat is affected by irradiation. The stability of the pigments responsible for color is an important consideration in the irradiation preservation of meats, at least for esthetic reasons. This study was carried out to determine the effect of irradiation on the myoglobins of beef.

Samples of metmyoglobin, myoglobin, or a mixture of oxy- and metmyoglobin in an oxygen or nitrogen atmosphere were γ-irradiated at 1 Mrad. The absorption spectra of these samples suggested that the iron was in the Fe^{3+} form but the normal metmyoglobin structure was destroyed. As the irradiation dose increased from 0 to 6 Mrad, the Soret absorbance of hemin and, to a lesser extent, myoglobin underwent a progressive decrease. Treatment of myoglobin with H_2S and γ-radiation singly and in combination provided evidence (spectral) that sulfmyoglobin per se cannot account for the absorption spectrum of irradiated myoglobin.

The fluorescent spectra of irradiated hemin and irradiated myoglobin that were not similar to that of protoporphyrin may be due, the authors suggest, to the presence of a chole-heme protein formed by rupture of the hemin nucleus.
[7 figures, 1 table, 15 references] FTP

3.2349 FROZEN FISH FILLETS

British Patent 1,198,748
Frionor Norsk Frossenfisk A/L (pat.)
Food Technology 25, No. 1, 56 (January 1971)

A vacuum processing method is used to produce frozen fish fillet blocks relatively free of voids. FTP

3.2349 JELLIED FISH PRODUCT

Japanese Patent 17133/70
Nippon Suisan KK. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

Raw fish materials are bleached at pH 5; then they are dehydrated and frozen. FTP

Amino acids and sorbitol are added to water-bleached, finely divided fish meat. The material is then frozen and stored. FTP

3.2349 FISH PRESERVATION (3.12)

Japanese Patent 17575/70
Taiyo Fishery Co. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

2.3 FISH COOKING

Japanese Patent 17131/70
Shudo, A., and N. Shudo (pat.)
Food Technology 25, No. 1, 56 (January 1971)

The fish are coated with a starch paste containing salt, then placed between electrodes and cooked electrically by direct conduction. FTP

3.15 EFFECT OF GAMMA-IRRADIATION ON CARBONYL COMPOUNDS AND FREE AMINO ACIDS IN WIENER SAUSAGE

Tajima, Makoto, Makio Morita, and Masao Fujimaki (Department of Agricultural Chemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 34, No. 12, 1859-1861 (December 1970)

Earlier work [K. Kôsaka, T. Tsukada, S. Yano, and H. Danbara, Nihon Shokuhinkogyo Gakkaishi 15, 507 (1968)] showed that irradiated (0.5 Mrad) wiener sausage had a shelf life three times longer than the nonirradiated product. In the present study, the researchers determined the effect of irradiation of wiener sausage on its content of carbonyl compounds and free amino acids. These particular compounds were considered because carbonyl compounds play an important role in the development of cooked flavor of meats and free amino acids are involved in nonenzymatic browning and also act as precursors of cooked flavor.

Wiener sausages, nonsmoked and smoked, were irradiated at 0.25 Mrad and 0.5 Mrad. The samples were stored at 5° C. The sausages were examined immediately after irradiation and again after 18 days' storage.

The total amount of carbonyl compounds increased in both the nonsmoked and the smoked wiener sausage with increasing dosages of irradiation.

The amount of free amino acids in the sausages did not change with irradiation of the product (analyses were made for aspartic acid, threonine, serine, glycine, alanine, cysteine, valine, methionine, isoleucine, leucine, tyrosine, phenylalanine, histidine, and arginine, and for ammonia). The authors conclude that low-level irradiation of wiener sausage does not affect the free amino-acid content. [Apparently R. O. Brooke, E. M. Ravesi, D. F. Gadbois, and M. A. Steinberg, Food Technology 18, 1060 (1964) obtained similar results with irradiated haddock fillets and clam meats.] [3 tables, 7 references] FTP

3.15 IMPROVEMENTS IN OR RELATING TO MICROWAVE HEATING

Meredith, R. J.; Associated Electrical Industries Ltd. (pat.)
British Patent 1,211,024
BFMIRA Abstracts 24, No. 1, Abstract No. 257, p. 53 (January 1971)

The microwave energy is applied to the substance being heated as a slow wave in a direction parallel to the direction of movement of the substance through the heating zone. No energy is applied in the transverse direction. This provides more uniform heating of the substance than with the application of energy in a transverse direction. Reprinted

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3.2342 FISH FREEZING BY IMMERSION IN CALCIUM CHLORIDE BRINE

Dalcq, P. (Div. Prod. Chim., S.A. Solvay et Cie, Brussels, Belgium)
Chemical Abstracts 73, No. 25, 129655d (December 21, 1970)

3.2342 IMPROVEMENTS IN OR RELATING TO COOLING OR FREEZING PROCESSES

British Patent 1,211,605
Thompson, S. S. (U.S.A.) (pat.)
BFMIRA 24, No. 1, Abstract No. 261, 54 (January 1971)

The method involves the injection of liquid nitrogen at atmospheric pressure into a secondary liquid refrigerant which is thereby cooled on expansion of the nitrogen to the gaseous state. It is claimed that the method is particularly applicable in the freezing of thick bodies such as fish, meat and poultry, which are immersed in the secondary refrigerant after it has been cooled. Reprinted LB

3.2349 VACUUM DRYING

British Patent 1,199,285
H. J. Heinz Co. Ltd. (Hayes Park, Hayes, Middlesex, United Kingdom) (pat.)
Refrigeration and Air Conditioning 73, No. 873, 69 (December 1970)

Usually vacuum freeze-drying of food or biological materials is a batch process, since opening and closing the processing system while simultaneously maintaining a vacuum is difficult. Now, however, a new process allows continuous vacuum drying--the goods to be processed pass through an air lock. LB

3.2344 FOOD FREEZING PROCESS

British Patent 1,201,807
Veb Kühlautomat (27 September 1968)
Refrigeration and Air Conditioning 73, No. 873, 69 (December 1970)

With this completely automatic freezing process, food is packed into cardboard containers at a filling station and then automatically fed into the cold-plate-type freezer. Once frozen into blocks, it is disengaged from the container and the empty containers are automatically returned to the filling station. LB

3.231 (3.2383) REFRIGERATED CONTAINER

British Patent 1,198,354
Cryotherm Inc. (Fogelsville, Pennsylvania) (pat.)
Refrigeration and Air Conditioning 73, No. 873, 69 (December 1970)

A refrigeration system for insulated containers is based on the use of liquid nitrogen. The system has the advantage of keeping the goods themselves from coming in direct contact with the liquid nitrogen while permitting continuous temperature control of the product. Reprinted LB

3.12 (3.2490) EFFECT OF BRINING AND POLYPHOSPHATE ON YIELD AND QUALITY

Dyer, William J. (Technol. Res. Lab., Fish. Res. Board Canada, Halifax, Nova Scotia)
Chemical Abstracts 74, No. 1, 2736w (January 4, 1971)

3.12 (7.89) HEALTH ASPECTS OF POLYPHOSPHATE UTILIZATION BY THE MEAT INDUSTRY

Petrovic, Ivan (Repub. Zavod Zastitu Zdravlja, SRH, Zagreb, Yugoslavia)
Chemical Abstracts 73, No. 21, 108378a (November 23, 1970)

3.2495 (3.12)(6.54) STUDIES ON THE CONTROL OF THE DENATURATION OF THE FISH MUSCLE PROTEINS DURING THE FROZEN STORAGE. I. PREVENTIVE EFFECT OF Na-GLUTAMATE

Noguchi, Satoshi, and Juichiro J. Matsumoto (Department of Chemistry, Sophia University, Chiyoda-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 10, 1078-1087 (October 1970)

To obtain information about the denaturation mechanism of fish muscle as a consequence of the interaction of proteins with other substances and to discover some new materials that will prevent denaturation during frozen storage, the authors tested the denaturation, in the presence of a variety of additives, of frozen carp actomyosin. They report the results of in vitro model tests in which they studied the effect of Na-glutamate on the denaturation of isolated actomyosin and of tests on the Na-glutamate effect on the quality of kamaboko jelly. Since the jelly-forming ability of a material is a good index of the state of the material's actomyosin molecules (a major factor in the texture of meats), they theorized that the results of their tests on the quality of kamaboko jelly should be applicable to the quality of other frozen-stored meats and meat products.

Carp actomyosin was either dissolved in 0.6 M KCl solution or suspended in 0.05 M KCl. The tests in 0.05 M KCl served as the model for the frozen-stored meat and the salt-free minced meat (the basic ingredient of kamaboko), and the 0.06 M KCl served as the model for the salted minced meat. Minced, washed, fresh horse mackerel (Trachurus japonicus) was used for the tests on kamaboko jelly.

To the actomyosin dissolved in 0.6 M KCl and to that suspended in 0.05 M KCL, either 0.3 M Na-glutamate, 1.0 M glucose, or 0.05 M urea was added. In the model

(over)

3.335 PROCESSING LOSS IN ROLLED MEAT PRODUCTS

Linke, H.
Fleischwirtschaft 49, 1469 (1969)
Food Manufacture 45, No. 10, 96 (October 1970)

To a great extent, preheating conditions determine the amount of weight lost from canned meat roulades. Losses from individual roulades during frying may vary appreciably, since under practical conditions they are not heated evenly, but the average loss is about 28%. When fat content is high, of course, weight loss is greater. Total heat loss, including that by frying and sterilization, averages about 37± 8%. Large-scale manufacture or small-scale does not affect these percentages significantly, nor do differences in the connective tissue of the meat. Technological influences on the relation between frying and sterilization losses are slight; low frying losses result in high sterilization losses, and conversely.

LB

3.3344 (7.592) A CAUSE AND MECHANISM OF BLUE DISCOLORATION OF CANNED CRAB MEAT.

Inoue, Norio, and Terushige Motohiro (Laboratory of Marine Food Technology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 945-948 and No. 10, 1040-1047 (September and October 1970)

IV. SPECTROPHOTOMETRIC STUDY OF BLUE MEAT, pp. 945-948.

In an earlier paper, the authors reported that crab hemocyanin would turn dark green when heated with hydrogen sulfide. They speculated that the reflectance spectrum of the compound so formed and that of the blue meat of unacceptable canned crab might be similar. Here they report the results of a spectrophotometric study of blue and normal meats of canned king crab (Paralithodes camtschatica) and the reaction between the crab's hemocyanin and hydrogen sulfide.

Maximum reflectance in the blue meat appeared at 550-570 mμ. If the color intensity was slight, maximum reflectance at 550 mμ was not evident; however, the percentage reflectance decreased as the intensity deepened. Maximum reflectance in the hemocyanin-sulfide complex appeared at 530-550 mμ; it did not appear in heat-coagulated hemocyanin. The relation between color intensity and the content of copper combined with sulfide was linear. The authors suggest that the analysis of percentage reflectance of the blue meat offers good possibilities for the color assessment of the bluing. [6 figures, 3 references]

V. ISOLATION OF CAUSATIVE SUBSTANCE OF BLUE MEAT, pp. 1040-1043.

Although the previous study showed that hemocyanin and hydrogen sulfide are involved in the blue discoloration of canned crab, it did not isolate the causative substance or reveal the chemical composition of the blue substance.

(over)

3.4 LIQUID SMOKES FOR USE IN CURED MEATS

Gorbatov, V. M., N. N. Krylova, V. P. Volovinskaya, Yu. N. Lyaskovskaya, K. I. Bazarova, R. I. Khlamova, and G. Ya. Yakovleva (All-Union Research Institute of the Meat Industry, Moscow, U.S.S.R.)
Food Technology 25, No. 1, 71-77 (January 1971)

The researchers made comparisons of the chemical composition and quality of nine commercial liquid smoke preparations from different parts of the world. Liquid smokes are prepared from the condensation products of the pyrolysis of wood. The authors found that the composition of the liquid smoke preparations did vary with the method of preparation, the quality of the smoke condensate, and the amount of purification of the condensate. They suggest that the commercial use of liquid smoke preparations in cured meats will require additional research and development work. The first table that follows shows the effect of moisture content of wood sawdust on the composition and quality of the liquid smoke; the second gives data on the analysis of commercial smoke preparations.

Moisture content of the wood sawdust	Yield per 100 g. of sawdust: Condensate	Phenols	Acids	Formaldehyde	Organoleptic quality
%	g.	mg.	mg.	mg.	
1.8	28.2	236	3,293	122	Unsatisfactory
21.5	41.5	136	3,288	81	Good
24.5	43.5	100	3,003	78	Good
31.2	32.8	33	890	--	Almost satisfactory

(over)

3.3344 (7.592)

The blue meat of canned king crab was incubated with protease at 40° C. for 24 hr., and the total nitrogen, crude protein, iron, copper, and inorganic sulfide content of the blue substance that was isolated was determined. Apart from the sulfur content, the chemical composition of the substance was quite similar to that of a hemocyanin-sulfide complex prepared from the crab. Sulfide was not detectable in the untreated blue meat or in the isolated blue substance treated with protease for 24 hr.; however, it was detectable in the substance treated for 48 hr. The authors deduce, therefore, that the causative substance of the blue discoloration of canned crab is the hemocyanin-sulfide complex.
[1 figure, 2 tables, 7 references]

VI. THE MECHANISM OF COPPER AND SULPHIDE REACTION IN HEAT-COAGULATED HAEMOCYANIN, pp. 1044-1047.

As early as 1934, Takayasu and Fukuhara proposed that the blue discoloration in canned crab is caused by a sulfide derivative of hemocyanin with a formula R-Cu-S-Cu-R or R-Cu-S, where R is a protein molecule. Some three decades later, Gordievskaya suggested that the blue coloration is caused by a copper-protein complex. In the previous study, the present authors found that the bluing is caused by a hemocyanin-sulfide complex. To determine the role played by copper in the hemocyanin-sulfide reaction, they investigated the state of the copper in heat-coagulated hemocyanin and in the hemocyanin-sulfide complex.

In heat-coagulated hemocyanin, half the copper was cuprous, and half was cupric. Under reducing conditions, most of the copper was cuprous. Since no cuprous copper was detectable when such chelating agents as EDTA were added, the valency of the copper apparently depends on the reduction or oxidation of the solution. In the hemocyanin-sulfide complex, the content of the copper and of the copper-bound sulfide was 17.6×10^{-3} and 8.7×10^{-3} μM/mg., respectively.
[1 figure, 4 tables, 9 references] LB

3.2495 (3.12)(6.54)

test, 0.3 M Na-glutamate was as effective as, or even more effective than, 1 M glucose in maintaining solubility, viscosity, ATPase activity, and ultracentrifugal patterns (showing sedimentation velocity); the addition of urea promoted denaturation. Results for tests with 0.6 M KCl were not significantly different from those with 0.05 M KCl. Tests in which the authors tried to determine the relation between the effect and the concentration of Na-glutamate on carp actomyosin dissolved in 0.6 M KCl and stored at -20° C. for 1 month showed that the effect of Na-glutamate approached the maximum at 0.025 M (0.42%).

The quality of kamaboko jelly was judged in terms of gel strength, expressible water, soluble protein (protein concentration of the supernatant being determined by the biuret method described by Umemoto in 1966), and durability (the ability of a disk 3 cm. in diameter and 5 mm. thick to withstand being folded once into a semicircle or twice into a quadrant without cracking or breaking). The kamaboko made from meat to which Na-glutamate had been added had a higher quality than did the control. Results of tests on the two types of product, made from minced horse mackerel and stored for 6 weeks at -20° C. are given below.

Kamaboko made from meat containing	Gel strength	Expressible water	Soluble protein	Durability on folding	Texture
	g./cm.	%	%*	**	
Na-glutamate	1,634	26.3	10.5	A	homogeneous
No Na-glutamate	890	28.8	8.0	B	heterogeneous

*By weight of wet minced meat. **A-no cracks when folded into quadrant; B-slight cracks when folded into semicircle.

The authors conclude that the model test is applicable for screening additives used to prevent freezing denaturation as well as for studying the mechanism of denaturation. [6 figures, 1 table, 24 references] LB

3.4

Origin of the commercial liquid smoke preparation	Composition of the liquid smoke preparations: Phenols	Carbonyl compounds: Total	Carbonyl compounds: Unsaturated	Carbonyl compounds: Saturated	Furfural	Acids	Esters	Methanol	Non-volatiles
	mmol./100 ml.								%
Japan	2.4	18.1	17.4	0.7	2.3	45.0	17.2	15.3	2.3
France	1.5	1.4	1.1	0.3	0.6	4.8	4.6	2.1	0.47
France	0.8	5.3	5.2	0.1	2.2	4.1	6.9	1.0	0.4
Hungary	3.4	11.4	4.7	6.7	1.1	53.7	59.5	2.0	0.16
Poland	30.0	7.8	7.8	0	0.6	1.6	1.5	3.2	13.6
Canada	2.1	16.8	11.2	5.6	0.5	100.0	8.1	4.9	3.5
U.S.S.R.	1.2	5.5	5.3	0.2	2.1	16.7	3.8	4.1	0.02
U.S.S.R.	2.2	10.5	6.0	4.5	0.5	45.0	44.6	1.6	1.4
U.S.S.R.	9.4	4.6	1.2	3.4	0	23.3	0.8	0	15.2

[11 figures, 3 tables, 30 references] FTP

3.2495 ANOMALOUS BEHAVIOR OF FROZEN COD MUSCLE STORED NEAR ITS MELTING POINT (1.51)

Love, R. Malcolm (Torry Res. Sta., Min. Technol., Aberdeen, Scotland)
Chemical Abstracts 73, No. 25, 129656e (December 21, 1970)

3.27 RAPID THAWING PROCESS FOR BLOCK FROZEN FISH (0.12)

Anonymous
Fd Wld 5, No. 10, 22-23 (1970)
BFMIRA 24, No. 1, Abstract No. 207, 43 (January 1971)

The thawing plant consists of a water bath heated to 25° C within a vacuum chamber, where steam forms at low temperature as the vacuum is drawn. There is no cooking and minimal loss of weight. Reprinted

3.27 INFLUENCE OF THAWING AND THAWING METHODS ON THE IMMEDIATE AND (3.239)(1.51) REFROZEN STORAGE QUALITY OF FISH (1.69)(1.4)

MacCallum, Wallace A., and D. R. Idler (Technol. Unit., Fish. Res. Board Canada, St. John's, Newfoundland)
Chemical Abstracts 74, No. 1, 2789r (January 4, 1971)

3.27 THAWING BY MICROWAVES

Meisel, M. N.
Industr. alim. agr. 86, 1251 (1969)
Food Manufacture 45, No. 10, 97 (October 1970)

The theory of using high-frequency heat to thaw deep-frozen meat is discussed and illustrated with practical examples. Operational conditions and effects are shown in tables and graphs, and the method of calculating processing costs is given. Advantages of the process, including advantages of using microwaves to thaw minced meat, are particularly evident in the flexibility it allows in production and marketing and the high quality of the product it yields. LB

3.4 DETERMINATION OF POLYCYCLIC AROMATIC HYDROCARBONS IN LIQUID SMOKE FLAVORS

White, Richard H., John W. Howard, and Charles J. Barnes (Division of Food Chemistry and Technology, Food and Drug Administration, Washington, D.C. 20204)
Journal of Agricultural and Food Chemistry 19, No. 1, 143-146 (January-February 1971)

Interest in the analysis of liquid smoke flavors has been stimulated by the earlier demonstration of the presence of the carcinogen benzo[α]pyrene and of other polycyclic hydrocarbons in smoked foods. The purpose of the present study was to develop analytical methods for the determination of polycyclic aromatic hydrocarbons in water-soluble smoke flavors and to determine the incidence of such compounds in the various liquid products now available commercially. In addition, analysis was made of the polycyclic aromatic hydrocarbon content of the resinous condensates that settle out on storage of the liquid smoke flavors.

The hydrocarbons in liquid smoke flavors and resinous condensate were isolated by liquid-liquid partition and thin-layer chromatography, and measured by ultraviolet and spectrophotofluorometric techniques. Data on the polycyclic aromatic hydrocarbon content of liquid smoke flavor samples are shown in the table that follows.

(over)

7.9 (9.19) CHARACTERIZATION OF OIL SLICKS ON SURFACE WATERS

Kawahara, Fred K., and Dwight G. Ballinger (Analytical Quality Control Laboratory, Federal Water Quality Administration, Cincinnati, Ohio 45202)
Industrial & Engineering Chemistry Product Research and Development 9, No. 4, 553-558 (December 1970)

Because the oil spills that do so much damage to the environment often occur unwitnessed, some means of identifying the source of the spill is necessary to control the resulting pollution and establish responsibility for it. This report extends the identification procedure developed by Johnson et al. in 1968 and Kawahara in 1969 to characterize heavy oils and asphalts. It illustrates use of the method by characterizing numerous oil spills of unknown character (the oil samples being collected from the inland and coastal waters of the United States), and it corroborates the findings with data provided by classical test methods.

Using two key ratios, 810 cm^{-1}/1375 cm^{-1} and 810 cm^{-1}/720 cm^{-1}, the authors analyzed the oil-spill samples by the method of ratios of infrared absorbance (RIA), using six wave numbers. They then confirmed the initial results by using four other ratios. Ratio values determined for the unidentified petroleum pollutants were compared with values determined for 41 commercial products (20 asphalt samples and 21 heavy residual oils) manufaccured by 7 petroleum companies. To confirm the RIA findings further, the authors also examined the oils' infrared spectra; their solubility in hexane, ether, and chloroform; their specific gravity; and their metal content. They suggest that use of this method of characterization can save from 30 to 50% of search time, since it eliminates a large number of petroleum products from further consideration. [5 figures, 5 tables, 4 references] LB

3.5 (3.2342) DRY SALTED FISH PRODUCT

Japanese Patent 18942/70
Nakamura, T. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

The fish are frozen in brine at -20° C., then dried in moving moisture-free air at a temperature lower than 0° C. FTP

3.9 FISH-DERIVED SEASONING

Japanese Patent 19629/70
Tominaga, N. (pat.)
Food Technology 25, No. 1, 66 (January 1971)

Seasoning compositions are prepared by mixing an aqueous suspension of red peppers, salt, and fish-derived amino acids. FTP

4.5 EFFECTS OF MODEL SYSTEM COMPOSITION ON AUTOXIDATION OF METHYL LINOLEATE

Heidelbaugh, Norman D., Cheng P. Yeh, and Marcus Karel (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Journal of Agricultural and Food Chemistry 19, No. 1, 140-142 (January-February 1971)

When foods contain significant amounts of metal catalysts, small amounts of water can be antioxidant by hydrating the catalysts (thus reducing their activity). For example, small increases in the water content of dehydrated foods may retard oxidative deterioration. However, water may also promote oxidation in foods, particularly in situations where the water content is high. Walnuts and beans tend to oxidize faster at very low and at very high moisture contents as compared to moisture levels in between these extremes. In the present study, the authors determined the effect of system composition on oxidation at various water activities [water activity (a_w) is defined as the ratio of partial pressure of water in food to the vapor pressure of pure water at the given temperature]. Such information is useful for the selection of optimum water contents in foods to retard lipid oxidation, especially for intermediate-moisture foods whose water content may be in the range in which the water changes from a predominantly antioxidant component to a prooxidant.

The researchers studied the autoxidation of methyl linoleate in model systems containing added cobalt nitrate and water-binding agents (cellulose, dextran, and glycerol). The water activity levels selected ranged from 0.11 to 0.96. Oxygen absorption of the samples at each water activity at 37° C. was followed with standard Warburg manometric techniques.

(over)

4.11 (7.773)

STUDIES ON THE DETERMINATION OF FATTY ACID CONSTITUENTS OF LIPIDS BY GAS CHROMATOGRAPHY

Hamada, Iwao, and Masami Hayashi
Journal of Faculty of Fisheries Prefectural University of Mie 8, No. 1, 63-72 (December 20, 1969) (In Japanese; figures, table, and résumé in English)

The technique of gas chromatographic analysis of fatty-acid methyl esters is examined, and selected chromatographic conditions are discussed. The fatty-acid constituents of sesame oil, soya-bean oil and lecithin, egg-yolk lecithin, olive oil, beef tallow, and lard were determined. The last four of these lipids presumably contain hexadecenoic acid; beef tallow and lard, presumably, contain pentadecanoic and heptadecanoic acid also. When soya-bean oil is heated, its unsaturated fatty-acid constituents decrease as the degree of unsaturation increases. [13 figures, 1 table, 14 references]

LB

4.5

In all the systems tested, water is antioxidant up to a critical water activity level, above which increases in water content promote oxidation. The critical water content and the critical water activity depended upon the composition of the model system. Cobalt and glycerol decreased the numerical value of the critical water content and of water activity; dextran increased the critical water content. The authors explained the results as follows: a small amount of water is bound to the polysaccharides and does not affect oxidation. Additional amounts of water are antioxidant because of the hydration of the catalysts and of the hydroperoxides. At high contents of water, the antioxidant effects are overshadowed by the ability of water to solubilize the metallic prooxidants (thus to mobilize them). [4 figures, 1 table, 17 references]

FTP

4.2 (3.15)

MASS SPECTROMETRY OF GLYCERYL ETHER DIESTERS

LeTellier, Paul R., and Wassef W. Nawar (Department of Food Science and Technology, University of Massachusetts, Amherst, Mass. 01002)
Journal of Agricultural and Food Chemistry 19, No. 1, 196-197 (January-February 1971)

The researchers undertook this study in order to evaluate the use of mass spectrometry for identifying individual glyceryl ether diesters and for determining the position of the ether group on the glycerol molecule. For this purpose, they synthesized the two positional isomers of both pentyl dihexanoin and hexyl dihexanoin and studied their mass spectra.
[1 figure, 7 references]

FTP

4.11 (2.8)

EVALUATION AND ANALYSIS OF FRYING FATS. II.

Mankel, A.
Fette Seifen Anstrmittel 72, No. 8, 677-688 (1970) (In German)
BFMIRA 23, No. 12, Abstract No. 2708, 647 (December 1970)

The fat content of fresh and fried fish and blanched and fried chips is tabulated. Detailed tables are given of the quality of fats and oils of various types before and after frying fish or chips.

Reprinted

3.4

SMOKE FLAVOR COMPOSITIONS

German Patent 1,692,227
Vsesoyuznyi Nauchno-Issledovatelskii Inst. Myasnoy Promyshlennosti (pat.)
Food Technology 25, No. 1, 66 (January 1971)

The smoke flavor compositions consist of wood distillate fractions that have been subjected to adsorption and desorption.

FTP

3.4

Liquid smoke flavor sample	Polycyclic aromatic hydrocarbon content in p.p.b.					
	Anthracene	Phenanthrene	Pyrene	Fluoranthene	Triphenylene	4-Methylbenzo[α]pyrene
No.						
1	10	35	2	3	7	2
2	9	34	2	3	7	--
3	7	35	11	--	--	--

Benzo[α]pyrene was found in the resinous condensate (that settled out of the liquid smoke flavor during storage) in amounts ranging from 25 to 3,800 p.p.b. [3 figures, 1 table, 9 references]

FTP

4.11

A NEW AND RAPID METHOD FOR THE ELECTRON MICROSCOPIC EXAMINATION OF FATS

Jewell, G. G., and M. L. Meara (British Food Manufacturing Industries Research Association, Randalls Road, Leatherhead, Surrey, England)
Journal of the American Oil Chemists' Society 47, No. 12, 535-538 (December 1970)

Information to date on the crystalline structure of fats has been based on the use of light microscopic and X-ray diffraction techniques. But, these methods do not cover the entire range of sizes of crystals because the light microscope enables measurements of crystals down to a value of 1 μ and the X-ray technique gives information on unit cells and repeating units in nanometers. The electron microscope (having a resolution limit of about 0.5 nm.) offers the possibility of direct visual observations of crystals in sizes precisely in the range of 1 nm. to > 0.1 μ (the light microscopic and X-ray techniques cannot span this range).

The authors developed a replica technique to study the crystalline structure of fats using the electron microscope.

A replica is prepared by the vacuum deposition of a layer of carbon onto the surface of the specimen. A contrasting agent (platinum) is vacuum deposited on the carbon layer from a precisely known angle (called shadowing). The substrate is removed from the replica by stripping or by solvent extraction and the replica is examined in the electron microscope. In this study the fats were frozen prior to replicating: the fat was removed from the replica by solvent extraction.

The authors found that freezing fats at different rates produced structural differences within the fat. They are now studying the differences in crystal habit exhibited by a wide variety of fats to determine the relationships between these parameters and the performance characteristics of the fats. [10 figures, 10 references]

FTP

4.6 (0.4) EFFECT OF ETHOXYQUIN ON THE LONGEVITY OF C3H MICE

Comfort, A., I. Youhotsky-Gore, and K. Pathmanathan (MRC Group on Ageing, Department of Zoology, University College, London WC1, England)
Nature 229, No. 5282, 254-255 (January 22, 1971)

Several workers have found that mice fed diets containing large amounts of α-tocopherol, 2-mercaptoethylamine, ethoxyquin, tert-butyl hydroxytoluene, dithiocarbamates, or nor-dihydroguaiaretic acid live longer than mice fed standard laboratory diets. In the life-span effects reported here, C3H mice (a strain reportedly unaffected by antioxidants) fed a standard pelleted diet moistened and reconstituted with 0.5% w/w ethoxyquin oil grew into significantly lighter adults, lost weight earlier, lived longer, and showed strikingly better activity and condition with age than did control mice fed an identical diet without the antioxidant. Such nonactuarial indices of ageing as pigment deposition and tumor incidence will be reported later.

The authors note that the increased longevity of the mice fed ethoxyquin is compatible with the hypothesis (Harman, 1956; Tappel, 1968; and Dormandy, 1969) that both natural and radiation-induced ageing may involve oxidative free radical attack on long-term molecules or on lipids. However, they suggest that other explanations are equally likely: the large amounts of chemicals may have spoiled the appetite of the mice or hindered food assimilation, causing the effect to be a result of covert calorie restriction; the excess antioxidant may have reduced the toxicity of the normal laboratory diet; the hepatic enzyme concentrations attributable to the ethoxyquin diet, a possible enzyme inducer, may have increased the mice's life expectancy; or straightforward chemical stress may have caused the longer gross survival. [1 figure, 2 tables, 18 references] LB

6.138 (4.21)(4.4)(4.5) AUTOXIDATIVE DETERIORATION OF FATS

Purr, A.
Fette·Seifen·Anstrichmittel 72, 725 (1970)
Food Manufacture 45, No. 12, 60 (December 1970)

During a study of the chemical changes that occur in low-moisture foodstuffs, the author constructed models of lipoxygenase and mixtures of enzymatically active systems. He tested the models to show their effect on the autoxidative deterioration of fats in dry products as a function of equilibrium moisture content. Since enzymatic lipolysis and lipoperoxidation and the subsequent formation of rancid products occur at equilibrium moisture content, they are independent of mobile water. Oxidation degrades the free, polyunsaturated fatty acids more than it does the glycerides. Using soya lecithin as the medium, the author found that phospholipase A and B and lipoxygenase gave results analogous to those of phospholipids. Horseradish peroxidase accelerated the decomposition of fatty hydroperoxides and hastened the formation of carbonylic deterioration products. When the above enzymes are all present in dry foodstuffs containing fats, the carbonyl compounds will form at low water levels. Addition of NADH-alcohol-dehydrogenase, however, will reduce the aldehydes to alcohols and improve the flavor of the foodstuff. LB

6.138 (4.22) HYDROGENATION OF NATURAL OILS WITH PLATINUM METAL GROUP CATALYSTS

Rylander, Paul N. (Engelhard Industries, Newark, New Jersey 07105)
Journal of the American Oil Chemists' Society 47, No. 12, 482-486 (December 1970)

This article is one of ten published from the Symposium "Hydrogenation" conducted by the American Oil Chemists' Society in New Orleans, La., on April 26-30, 1970. It discusses the noble metal (ruthenium, rhodium, palladium, osmium, iridium, platinum) catalysts as a group, points out similarities and differences among the metals relevant to the hydrogenation of natural oils, and describes some of the practical applications of catalysis by palladium.

From the economic standpoint, commercial applications of noble metal catalysts would be limited to palladium or to palladium admixed with small amounts of other noble metals as promoters. Palladium and ruthenium are comparable in price; the other noble metals are more costly. Palladium is the most active of the metals. [The absolute, or even relative, activity of the catalysts depends upon the support, method of preparation, substrate, impurities, and substrate condition. Nonetheless, a general sequence for activity for olefin saturation is Pd > Rh > Pt >> Ir > Ru >> Os.] Palladium is anywhere from 30 to 100 times more active than nickel in hydrogenation of oils.

Two major technical problems are connected with processing over palladium catalysts: (1) maintenance of a sufficiently clean system and (2) control of trans isomers in partially hydrogenated oils. Because palladium is so exceedingly active, only small amounts are needed, but the catalyst becomes sensitive to poisons. Also, hydrogenations over palladium catalysts tend to produce relatively

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6.138 (4.22) HYDROGENATION OF UNSATURATED FATTY ESTERS WITH COPPER-CHROMITE CATALYST: KINETICS, MECHANISM AND ISOMERIZATION

Koritala, Sambasivarao (Northern Regional Research Laboratory, Peoria, Illinois 61604)
Journal of the American Oil Chemists' Society 47, No. 12, 463-466 (December 1970)

This article is one of ten published from the Symposium "Hydrogenation" conducted by the American Oil Chemists' Society in New Orleans, La., on April 26-30, 1970. The author reviews some of the work at his laboratory on the mechanism of hydrogenation with copper chromite and explains the reactions of unsaturated fatty esters with copper chromite based on conjugation of double bonds before hydrogenation.

Hydrogenation of linolenate with copper chromite catalyst produced a large amount of conjugated diene and minor amounts of nonconjugatable dienes. The double bonds in the conjugated dienes and the monoenes were scrambled along the chain; the author explained such distribution of product based on the assumption that hydrogenation followed the conjugation of the double bonds. Fatty esters with conjugated double bonds were reduced preferentially over fatty esters with methylene-interrupted double bonds (under conditions of competitive hydrogenation). Geometric and positional isomerization of conjugated double bonds occurred more rapidly than reduction. When reduction of the conjugated double bonds was carried out in the presence of deuterium, the majority of the resulting products contained no deuterium; most of the added deuterium was incorporated into the unreacted material. [4 figures, 3 tables, 26 references] FTP

6.133 (4.29)(6.135) (0.12) FATS AND OILS - DISTILLATIVE DEACIDIFICATION

Liebing, H. A.
Fette·Seifen·Anstrichmittel 72, 640 (1970)
Food Manufacture 45, No. 12, 60 (December 1970)

Following a discussion of the general principles of steam distillation, the author describes a method, with diagrams, for calculating the amount of stripping steam consumed during the distillative deacidification of various types of fats and oils. Using palm, coconut, peanut, and rapeseed oils as examples, he shows how the consumption of stripping steam can be kept to a minimum. The operation of a plant for continuous distillative deacidification and deodorization is described, with illustrations, and the fatty-acid composition of important vegetable, animal, and marine oils and animal and marine fats is tabulated. LB

6.138 (4.22) THE EFFECT OF PROCESS CONDITIONS ON POSITIONAL AND GEOMETRIC ISOMERIZATION DURING PARTIAL HYDROGENATION OF TRILINOLEIN WITH COPPER CATALYST

Kirschner, E., and E. R. Lowrey (The Procter & Gamble Co., 6000 Center Hill Road, Cincinnati, Ohio 45224)
Journal of the American Oil Chemists' Society 47, No. 12, 467-469 (December 1970)

This article is one of ten published from the Symposium "Hydrogenation" conducted by the American Oil Chemists' Society in New Orleans, La., on April 26-30, 1970. In this paper, the authors describe the effect of varying the pressure, temperature, and catalyst concentration on the distribution of isomers (geometric and positional) formed during hydrogenation of trilinolein with a copper catalyst (copper chromite promoted with manganese).

The trilinolein was prepared by esterification of glycerol with linoleic acid (obtained by solvent fractionation of esters of safflower fatty acids); the triglyceride was further purified by solvent fractionation. The fatty-acid composition of the trilinolein was 0.3% $C_{16:0}$, 1.3% $C_{18:1}$, 97.8% $C_{18:2}$, and 0.2% $C_{18:3}$. Two levels of pressure (50 p.s.i.g., 100 p.s.i.g.), temperature (340° F., 392° F.), and catalyst concentration (1%, 2% by weight) were used. The trilinolein was hydrogenated in a stainless-steel batch reactor that was fitted with baffles and agitator, and inlet through which hydrogen could be continuously passed.

Change in temperature levels produced modest effects on diene isomer distributions; pressure and catalyst concentration had little or no effect. The distribution of monoene isomers does not appear to vary during the hydrogenation, and variations of reaction conditions appear to have little effect on the distributions (within the range of variables studied).
[4 figures, 1 table, 21 references] FTP

5.5 EFFECT OF FREEZING ON OXIDATION OF L-ASCORBIC ACID

Thompson, Lilian Umale, and Owen Fennema (Department of Food Science, University of Wisconsin, Madison, Wisconsin 53706)
Journal of Agricultural and Food Chemistry 19, No. 1, 121-124 (January-February 1971)

Earlier studies by various investigators showed that freezing affects the stability of L-ascorbic acid differently from that in dilute simple solutions. L-ascorbic acid is generally more stable in frozen foods than in unfrozen foods. N. H. Grant, and H. E. Alburn [Science 150, 1589 (1965)] found that L-ascorbic acid was less stable (the rate of oxidation was greater) at -11° C. in solutions containing 10^{-4} L-ascorbic acid and 0.02 M acetate buffer at pH values of 5.0 and 5.5 than at +1° C. in the same solutions and at the same pH values. In the present study, the researchers determined the rate of oxidation of L-ascorbic acid in acetate buffer solutions at pH values of 4.6 and 5.5, at various L-ascorbic acid concentrations, and at temperatures ranging from +21° C. to -23° C.

The samples containing 1.7 mg. L-ascorbic acid in 0.00087 M acetate buffer (dilute solutions capable of dissolving substantial quantities of oxygen) and those samples which had pH values of 5.5 showed upon freezing either an increased rate of oxidation of L-ascorbic acid or a smaller than expected decrease in rate. Samples having a higher concentration of L-ascorbic acid and buffer (40 mg. of L-ascorbic acid per 100 ml. and 0.02 M acetate buffer; and 2,000 mg. of L-ascorbic acid per 100 ml. and 1.0 M acetate buffer) and a pH value of 4.6 (conditions common to many foods) freezing caused expected decreases in the rate of oxidation of the L-ascorbic acid. [2 figures, 2 tables, 22 references] FTP

6.138 (4.22)

large amounts of trans isomers, but the amount produced can be controlled by processing conditions. So far, palladium has not been adapted for commercial scale partial hydrogenations of natural oils, because the amount needed is very small and plant equipment must be altered or designed to handle filtration and recovery of small amounts of catalysts.
[5 tables, 39 references] FTP

4.21 (7.594)(6.139) PEROXIDES. I. OXIDATION, DECARBOXYLATION, AND RANCIDITY

Citrilli, Giovanni, and Mauro Sandri (Bologna, Italy)
Chemical Abstracts 73, No. 1, 2823b (July 6, 1970)

4.21 (4.64) ANTIOXIDATIVE EFFECT OF KOJIC ACID DERIVATIVES. I. ALKYL- AND O-ACYLKOJIC ACIDS

Abe, Yoshiro, and Yukio Takahashi (Fac. Eng. Keio Univ., Tokyo, Japan)
Chemical Abstracts 72, No. 14, 68486e (April 6, 1970)

6.190 (6.139) EFFECT OF FISH SPECIES AND PRODUCTION PROCESS ON THE INGREDIENTS AND QUALITY OF FISH MEALS

Schiller, Klaere, and Edgar Schulz (Inst. Tierernaehr., Forschungsanst. Landwirt., Brunswick-Voelkenrode, Germany)
Chemical Abstracts 73, No. 25, 128438y (December 21, 1970)

6.195 NUTRITIONAL REPORT FROM THE 14TH WORLD'S POULTRY CONGRESS. PART II. CHICK NUTRITION AND THE EVALUATION OF VARIOUS FEED INGREDIENTS

Couch, J. R. (Department of Poultry Science, Texas A & M University, College Station, Texas)
Feedstuffs 43, No. 5, 14-16 (January 30, 1971)

In Part I of this report, Dr. Couch summarized papers (presented at the 14th World's Poultry Congress, held in Madrid, Spain, in 1970) that dealt with nutrition of laying hens and broilers. In this second, and last, part, he summarizes papers that dealt with chick and turkey nutrition, turkey management, and the value of various feed ingredients. A paper on protein sources in the U.A.R. is summarized below.

In a rather extensive series of experiments, the animal production department at Ain Shams University incorporated protein concentrates (including fish meal, sardine meal, meat meal, blood meal, cottonseed meal, sesame meal, and horse beans) into semipurified. isocaloric, and complete chick diets at a level to provide 16.14 and 12% protein. The tests lasted 4 weeks. Sardine meal was best in protein efficiency; fish meal was second best. Cottonseed meal was best of the plant proteins, followed in order by sesame meal and horse beans. Meat meal and blood meal were low in protein efficiency, possibly due to unfavorable processing conditions.

LB

6.52 EFFECT OF PROTEIN AND FAT LEVELS IN COMPLETE PELLETED DIETS ON THE GROWTH OF MINK KITS

Kumeno, F., K. Itoyama, J. Hasegawa, and S. Aoki (Nippon Formula Feed Manufacturing Co., Yokohama, Japan)
Journal of Animal Science 31, No. 5, 894-899 (November 1970)
S. H. Morrison (reviewer)
Feedstuffs 43, No. 5, 30, 37 (January 30, 1971)

As a rule, mink ranchers feed diets consisting of 70 or 80% of fresh or frozen meat (thawed), poultry, fish byproducts, or whole fish. Only 20 or 30% is commercial dry mink feed. In the experiments reviewed here, nine groups of pastel mink kits (10 kits to a group) were fed free choice exclusively on dry pelleted diets from age 2 months (on June 23) to pelting (on December 10). A control group of 10 kits was hand-fed a normal wet diet once or twice a day in the conventional manner.

The diets were made of finely ground mixed ingredients formed into 3/16-in. pellets, supplemented with stabilizing extra fancy tallow till the fat content was between 15 and 24%, and coated with pelleting fines to prevent sticking. The experimental feeding was conducted in three phases: (1) the effects of three levels of protein and fat, in a 3 × 3 factorial arrangement, were compared for 1 month; (2) the slowly responding kits on the low-protein diets were transferred to the MH diet (see note below tables on back of card); (3) these slow-growing kits were removed from the experiment.

The results show that the 25% protein requirement set forth in Nutrient Requirements of Mink and Foxes (NRC-NAS Publ. 1676, 1968) is inadequate for this type of diet. Other results are summarized in the tables on the back.

(over)

6.54 MANUFACTURE OF FRANKFURTER-TYPE SAUSAGES
(3.336)

Kotter, L., et al.
Fleischwirtschaft 49, 1623 (1969)
Food Manufacture 45, No. 10, 97 (October 1970)

The chemical processes, and the effects of various additives upon them, that ensue during the manufacture of frankfurter-type sausages are discussed. Dissolved fibrillar muscle protein is a prime factor in the formation of structure, the sliceability, and the binding of the coarse ingredients in sausage. The amount of added solvent, the presence of actomyosin-dissociated substances, the pH and the degree of comminution of the meat, and the temperature during mincing are all important in the dissolution of the protein. Since optimum activation of fibrillar muscle protein in sausages that are to be heated is not always possible, substances to facilitate chopping, water binding, fat emulsification, and structure formation are often added.

Under practical manufacturing conditions, the authors compared the effect on frankfurter quality of added soya protein, hydrolyzed milk protein, dried blood plasma, or diphosphates. They determined cooking losses from the results of a scalding test and the amount of jelly and fat deposits for both canned and uncanned sausages.

Only when the sausage mixture was relatively heat-labile (that is, when the muscle protein was relatively inactive) was soya protein, added dry or as an emulsion, definitely superior to hydrolyzed milk protein. The authors suggest that

(over)

6.54 ENZYMATIC SOLUBILIZATION OF FISH PROTEIN CONCENTRATE: BATCH STUDIES APPLICABLE TO CONTINUOUS ENZYME RECYCLING PROCESSES

Cheftel, Claude, Michael Ahern, Daniel I. C. Wang, and Steven R. Tannenbaum (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Journal of Agricultural and Food Chemistry 19, No. 1, 155-161 (January-February 1971)

Fish protein concentrate (FPC) prepared by solvent extraction of fish is not readily soluble or dispersible in foods. Because the protein of FPC is of high biological value, it should be in forms useful in a variety of foods such as soups, weaning foods, and protein beverages. This paper reports on studies of batch experiments to obtain data on a continuous solubilization process of FPC by proteolytic enzymes (of plants, animals, and microorganisms). The batch kinetic data were gathered by the researchers with the intention of converting this system into a continuous reactor capable of enzyme reuse through application of an ultrafiltration membrane. Methods were adapted for the assay of the proteolytic activity in the FPC hydrolysates.

The FPC used had been prepared by isopropanol extraction of fresh whole red hake (Urophycis chuss). The following commercial enzyme preparations were used: Pronase; pepsin; papain; bromelin; ficin; Rhozyme P11; Rhozyme 41; enzyme No. 56; and Monzyme PA-1™.

Pepsin and Pronase were particularly effective for solubilization of FPC. Because Pronase appeared to be particularly promising for a continuous proteolytic process with reutilization of enzyme, the researchers determined the effects of pH, temperature, substrate, and enzyme concentrations on the rate and extent of FPC

 (over)

6.52

Main ingredients of experimental pelleted diets (%)

Ingredient	LL	LM	LH	ML	MM	MH	HL	HM	HH
White-fish meal	30.3	30.3	30.3	44.0	44.0	44.0	60.0	60.0	60.0
Ground, cooked wheat	17.3	15.6	13.9	12.7	11.0	9.4	7.4	5.7	4.0
Cooked potato starch	34.4	31.1	27.8	25.3	22.0	18.6	14.6	11.3	8.0
Tallow	11.0	16.0	21.0	11.0	16.0	21.0	11.0	16.0	21.0

Main ingredients of wet control diets, by month fed (%)

Ingredient	June-July	Aug.	Sept.	Oct.	Nov.	Dec.
Whale meat	1.9	0.3	7.0	16.1	16.0	12.0
lung	4.1	4.1	3.7	2.1	5.0	6.0
blood	5.7	3.2	3.5	3.2	4.0	7.5
Sole (mixed species)	76.0	79.0	72.1	61.0	55.0	48.5
Wheat flour	3.4	2.7	3.8	3.9	7.5	11.0
Tomato	2.3	2.6	2.9	3.8	6.5	7.0

Effect of diets on kit performance and fur quality

Effect	Control	LL*	LM*	LH*	ML	MM	MH	HL	HM	HH
Feed (g.)/1-g. gain:										
Phase 1	12.9	7.6	8.0	6.6	6.2	5.5	4.2	5.0	5.3	5.2
2	20.4	6.2	6.5	5.7	12.0	9.2	7.4	12.2	11.1	7.1
3	56.4				16.2	11.6	12.8	10.3	11.8	11.7
Mink weight at pelting (g.)	1917	*Kits started on these diets transferred to MH diets at end of Phase 1			1861	1763	2004	2048	1895	1891
Average pelt: size (cm.)	68.2				68.3	67.0	71.4	68.2	67.6	68.1
quality	D				D	D	E	C	B	D

Note: L, M, and H refer to low, medium, and high levels, respectively. The first of the paired letters describes protein level; the second, fat level. LB

6.54 MODERN DRY SAUSAGE MANUFACTURE

Reuter, H.
Fleischwirtschaft 50, 637 (1970)
Food Manufacture 45, No. 10, 96 (October 1970)

New methods for processing dry sausages are discussed. For fresh dry sausages that can be sliced or spread and for firm dry sausages having a long shelf life, vacuum mixers should be used to remove air from the sausage mixture before the casings are filled; vacuum filling machines should be used to fill the casings. Also discussed is the correct processing method for: deep-frozen meat; air-dried sausages covered with mold; dry, ripened, smoked sausages in which glucono-delta-lactone or other starter cultures are used; and packaging whole or sliced sausages for long shelf life in tropical countries. LB

6.54

proteolysis and solubilization by Pronase. Also, the stability of Pronase was determined during the hydrolysis of FPC. After 8 hr. of proteolysis of FPC by Pronase at 34° C., the Pronase degradation was approximately 30%, and inhibition of Pronase by the products of proteolysis was 60%. The molecular weights of the soluble peptides seemed to be less than 2,000; the molecular weights of the proteolytic enzymes of Pronase were around 20,000.
[2 figures, 11 tables, 17 references] FTP

6.59 SEARCH FOR METHODS FOR REMOVING UREA FROM SHARK MEAT (1.70)

Skachkov, V. P. (U.S.S.R.)
Chemical Abstracts 73, No. 21, 108348r (November 23, 1970)

6.54 FISH PROTEIN CONCENTRATES

Japanese Patent 19621/70
Libenson, C. M. (pat.)
Food Technology 25, No. 1, 56 (January 1971)

Fish meat is subjected to alkaline hydrolysis; the lipoproteins and free fats are precipitated and removed. The remaining solution is oxidized, neutralized, and deodorized to yield a concentrated protein fraction. FTP

6.54 (3.336)

self-creating, cohesive coagulation of soya protein accounts for this finding. In high concentrations, soya protein caused an off-flavor. Possibly due to the fibrinogen part, the properties of blood plasma were similar to those of soya protein. Since it is not structure forming, sodium caseinate was effective mainly as a hydrating and emulsifying agent. Diphosphates improved flavor better than dried protein and salt mixtures did, for they have a specific actomyosin-dissociating effect. Of five glycerine preparations tested, only the lactic acid ester of a monoglyceride was suitable as a frankfurter additive; a diphosphate mixture, tested for comparison at pH 7.25, was considerably more effective. LB

6.54 CONTROL OF DRY SAUSAGE RIPENING

Pezacki, W.
Fleischwirtschaft 50, 469 (1970)
Food Manufacture 45, No. 10, 96-97 (October 1970)

The conversion of carbohydrates during the ripening of dry sausages consists partly of homofermentative buildup of acid and partly of heterofermentative buildup of acid and oxidation. Mechanical, physical, chemical, and biological factors influence ripening; the better they ensure a desirable redox potential, the more effective they are. If the inside of the sausage is protected from air during storage, the fat is the main constituent that is oxidized. The entry of oxygen can be controlled if the sausages are given a particular shape. Results of tests on sausages made in this shape are given. LB

6.195 PROTEIN QUALITY OF DIFFERENTLY PREPARED FISH MEALS FROM VARIOUS RAW MATERIALS (6.191)

Bock, H. D., F. Kreienbring, U. Herrmann, K. Roepke, and J. W. Wuensche (Oskar-Kellner-Inst. Tierernaehr., Deut. Akad. Landwirtschaftwiss., Berlin, Rostock, Germany)
Chemical Abstracts 74, No. 1, 2816x (January 4, 1971)

6.54 (2.3) FISH SCRAP OFFERS HIGH QUALITY PROTEIN

Carver, J. H., and F. J. King (Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Massachusetts)
Food Engineering 43, No. 1, 75-76 (January 1971)

Fish-deboning machines have been used commercially for several decades. This article describes one of them and suggests possible uses of the recovered, comminuted product.

The machine consists of an endless rubber or plastic belt pressing tightly against the outside of a rotating, open-ended, perforated drum. Belt and drum move in the same direction but, since they move at different speeds, a shear force is brought to bear on the fish squeezed against the drum. The soft, plastic fish flesh is forced through the perforations into the drum (whence it falls into a collector bin) while the skin and bone remain on the outside of the drum, to be scraped off into a waste chute. The yield of edible flesh ranges from 40 to 86%, depending on the type of fish being deboned. Use of the machine to recover fish flesh from fillet wastes, say the authors, could add some $17,000,000 to U.S. processors' earnings.

Taste panels have found three of the products made from the recovered flesh acceptable: fish cakes (50% whiting, 49% potato, 1% salt, pepper, and dehydrated onion), canned fish (salad oil, salt, and fish retorted), and frankfurters (76% cod or haddock, 10% salad oil, 7.5% flour, 2.5% seasoning, 2% salt, and 2% corn syrup solids). The authors suggest other possible uses of recovered fish flesh.

LB

8.42 TRACE MINERALS IN TYPE A SCHOOL LUNCHES

Murphy, Elizabeth W., Louise Page, and Bernice K. Watt (Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Maryland)
Journal of the American Dietetic Association 58, No. 2, 115-122 (February 1971)

This article contains data on the content of nine trace elements in Type A school lunches served to sixth grade children. A Type A lunch for a 10- to 12-year-old child (under the pattern in effect at the time of the study) must contain at least 1/2 pt. fluid whole milk served as a beverage; 2 oz. of meat (edible portion as served); 3/4-cup serving of two or more vegetables or fruits, or both; one slice of whole grain or enriched bread; and 2 tsp. of butter or fortified margarine. Samples of Type A school lunches were collected from 300 schools for the analyses.

On the average the lunches contained 0.019 mg. chromium, 0.34 mg. copper, 0.45 mg. manganese, 3.91 mg. zinc, 8.26 mg. aluminum, 0.17 mg. barium, 0.50 mg. boron, 0.013 mg. cadmium, and 0.33 mg. stable strontium. The amounts of copper and chromium are probably marginal or low; manganese may be adequate; and zinc is probably adequate. The amount of aluminum in the lunches varied widely. Cadmium and chromium contents were near the lower limits of sensitivity for the analytical method used. The contents of all trace elements were significantly related to food energy of the Type A lunches. [4 tables, 25 references] FTP

7.80 (9.6) SENSORY EVALUATION OF FOOD

Drake, B., and B. Johannson
Academic Press, 111 Fifth Avenue, New York, N.Y. 10003 (1969), Vols. 1 and 2, 418 pp., price $18 each volume.
Food Technology 25, No. 1, 87 (January 1971)

These two volumes contain an annotated bibliography covering 725 papers in the physiology, 465 in the psychology, 670 in the methodology, and 364 in the application of sensory evaluation. FTP

9.14 (5.7) REQUIREMENT OF YOUNG CARP FOR α-TOCOPHEROL

Watanabe, Takeshi (Laboratory of Fisheries Biochemistry, Tokyo University of Fisheries, Minato-ku, Tokyo, Japan), Fumio Takashima (Department of Fisheries, Faculty of Agriculture, The University of Tokyo, Bunkyo-ku, Tokyo), Chinkichi Ogino, and Takashi Hibiya
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 972-976 (September 1970)

In an earlier paper, the authors reported that carp fed a diet deficient in α-tocopherol showed symptoms of muscular dystrophy, or "Sekoke disease," a malady induced by consumption of oxidized oil. In the present paper, they report the results of experiments in which carp were fed for 90 days on four diets supplemented with varying amounts of DL-α-tocopherol and two diets to which no tocopherol was added. In three of the enriched diets, 10, 30, or 50 mg. of tocopherol per 100 g. dry diet was added to the methyl esters from soy-bean oil; in the other, 30 mg. tocopherol/100 g. was added to a diet containing 5% of soy-bean oil rather than the methyl esters.

Carp fed the diets containing no tocopherol began to show signs of muscular dystrophy within 50 days of the start of the test. By the end of the test, more than 90% of the fish showed symptoms of this disease. Around the 70th day, these fish began to show lordosis, frequently accompanied by acute protrusion of the eyes; swollen, fluid-filled bodies, reflecting low protein content and high TBA values; and a high rate of mortality. Fish receiving diets enriched with α-tocopherol showed no signs of muscular dystrophy.

(over)

7.85 (1.85) MICROBIAL FLORA OF GULF OF MEXICO AND POND SHRIMP

Vanderzant, C., E. Mroz, and R. Nickelson
J. Milk Fd Technol. 33, No. 8, 346-350 (1970)
BFMIRA 23, No. 12, Abstract No. 2658, 637 (December 1970)

Bacterial counts of shrimp delivered to processing plants varied greatly from 870-1,300,000/g (aerobic plate counts at 28°C). The flora was predominantly Pseudomonas, Moraxella and Micrococcus. The flora of shrimp raised in artificial ponds were much lower than those of Gulf shrimp. Reprinted

7.89
(6.54) METHOD FOR EXTRACTION AND COLORIMETRIC DETERMINATION OF ISOPROPANOL IN FISH PROTEIN CONCENTRATES

Dambergs, N., and L. W. Regier
Fisheries Research Board of Canada, New Series Circular No. 39, 5 pp. (November 10, 1970) (Halifax Laboratory, Halifax, Nova Scotia)

This circular describes a colorimetric method for the determination of isopropanol (IPA) in fish protein concentrates (FPC). Although methods of analysis based on gas-liquid chromatography are available, they may be beyond the reach of many control laboratories. The authors developed this colorimetric method for use in such laboratories.

The IPA is separated from the FPC by distillation in the presence of excess water. The condensate (containing the IPA) is treated with an oxidizing agent to produce acetone (from the IPA). The acetone is reacted with salicylaldehyde to produce dihydroxybenzal acetone, a red-orange compound. The amount of dihydroxybenzal acetone is measured colorimetrically. The percentage of IPA in the FPC is calculated using a standard IPA curve. FTP

7.9
(9.19) EVAPORATION OF DDT

Lloyd-Jones, C. P. (Long Ashton Research Station, University of Bristol, Bristol, England)
Nature 229, No. 5279, 65-66 (January 1, 1971)

In 1969, researchers investigating the persistent organochlorine pesticides used in Great Britain suggested that DDT moving unchanged from treated crops into the atmosphere contribute to contamination of the environment. In 1965, Wheatley found that 50% of the DDT applied to the surface of soil would disappear in 4 or 5 months; and in 1968, Stringer et al. found that 60% of the DDT applied to an apple orchard could not be accounted for. If the loss of DDT is due to evaporation, as suggested by Ward et al. in 1955, the probable rate of loss can be calculated in either of two ways: (1) from the rate of evaporation, which is dependent on vapor pressure, and from the rate of diffusion of the evaporated molecules through the layer of still air above the DDT deposit; or (2) from the relation between the rate of DDT loss and the product of the vapor pressure and the square root of the molecular weight (Hartley, 1969).

Evaporation rates experimentally determined by the author agreed with those determined by calculation. Converted to field scale, the results suggest that DDT is lost at the rate of about 2 lb. per acre per year in summer and at about 0.3 lb. per acre per year in winter. The implication of these results is that about half the DDT applied to field crops every year may be introduced into the atmosphere by evaporation. [8 references] LB

7.80
(3.15) QUALITY INDICES THAT CAN BE USED TO ASSESS IRRADIATED SEAFOODS

Spinelli, John, G. Pelroy, and David T. Miyauchi (Technol. Lab., Bur. of Comm. Fish., Seattle, Washington)
Chemical Abstracts 74, No. 1, 2738y (January 4, 1971)

9.2
(9.3) THE CONCEPT OF THE MARGINAL YIELD FROM EXPLOITED FISH STOCKS

Gulland, J. A. (Fisheries Dept., FAO, Rome, Italy)
J. Cons. 32, No. 2, 256-269 (1968)
Sport Fishery Abstracts 15, No. 3, Abstract 12342, p. 288 (1970)

When increasing fishing effort is applied to an exploited stock, the increase in total yield (the marginal yield) is less than might be estimated from the product of the increase in effort and the catch-per-unit effort. The marginal efficiency, defined as the percentage that the actual increase is of the expected increase, decreases from near 100% for very lightly fished stocks. The greatest form of the marginal yield is usually found for stocks of intermediate size, and for very heavily fished stocks. The implications of the concepts of marginal yield and marginal efficiency for fisheries development and management are discussed. (Auth.)

Reprinted

9.14 (5.7)

This experiment demonstrated anew that an α-tocopherol-supplemented diet containing 5% of methyl esters will sustain the normal growth of carp fingerlings. The α-tocopherol required for optimal growth is about 10 mg./100 g. of dry diet. LB
[1 figure, 2 tables, 9 references]

8.59
(5.4) ATRININE, A NEW BETAINE ISOLATED FROM THE ADDUCTOR MUSCLE OF FAN-MUSSEL

Konosu, Shoji, Yen-Nan Chen, and Katsuko Watanabe (Laboratory of Marine Biochemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 940-944 (September 1970)

During chromatographic analysis of quaternary ammonium bases in the adductor of fan mussel (Atrina pectinata japonica), the authors discovered a hitherto unknown betaine. They isolated it by ion-exchange column chromatography and crystallized it as its hydrochloride. From the hydrochloride's elementary composition, color reactions, proton resonance, and infrared absorption spectra, they postulated that it is trimethyl-(2-carboxy-3-hydroxypropyl)-ammonium chloride. The new betaine, an isomer of carnitine, was named "atrinine" after the fan mussel.
[2 figures, 3 references] LB

8.8
(3.2491)(2.15) GREEN DISCOLORATION OF SHIP-FROZEN FILLETS OF FISH VARIETIES

Bito, Masamichi, and Keishi Amano (Tokai Reg. Fish. Res. Lab., Tokyo, Japan)
Chemical Abstracts 73, No. 19, 97540u (November 9, 1970)

7.6 TENTATIVE RULES FOR GENERIC DESCRIPTORS AND TRIVIAL NAMES FOR VITAMINS AND RELATED COMPOUNDS

Anonymous
Journal of Nutrition 101, No. 1, 133-140 (January 1971)

9.14 (1.85) NUTRITIONAL REQUIREMENTS OF PRAWN. I. FEEDING ON ARTIFICIAL DIET

Kanazawa, Akio, Makoto Shimaya, Mitsuyasu Kawasaki, and Ken-ichi Kashiwada (Laboratory of Fisheries Chemistry, Faculty of Fisheries, Kagoshima University, Kagoshima, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 9, 949-954 (September 1970)

Although prawns can be cultured successfully by being fed such natural diets as Tapes philippinarum or Mytilus crassitesta, maintaining the necessary supply of fresh mollusks can be difficult. Therefore the authors attempted to formulate an artificial diet consisting of materials chemically defined to meet the nutritional requirements of the prawn. Using the diets previously determined as nutritionally adequate for silkworm, chinook salmon, and brine shrimp, they tested the effects of four formula diets on Penaeus japonicus. The composition of the four is shown on the back of the card. The results of feeding each is shown below. [1 figure, 6 tables, 35 references]

Diet	Period fed	Average body weight at stage of test		Growth rate
		Start	End	
	days	grams	grams	percent
1	30	0.54	0.71	20
2	30	0.98	1.22	25
3	17	1.02	1.32	63
4	30	1.57	2.22	72

Note: Growth rate is expressed as a percentage of the growth rate of clam-fed controls.

(over)

9.15 (2.4)(1.87) DISINFECTION PROCEDURES FOR THE CONTROL OF BLOOD DISEASE (GAFFKEMIA) IN LOBSTER STORAGE FACILITIES

Cornick, John W., and James E. Stewart (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Fisheries Research Board of Canada, New Series Circular No. 42, 3 pp. (December 16, 1970)

After gaffkemia (a blood disease fatal to lobsters) has gained a foothold in lobster tanks or tidal pounds, the causative bacterium can be eradicated only by shutdown and thorough disinfection of the pound. Such a resort leads to loss of time and money. The most effective control, then, is regular cleaning and disinfecting throughout the year. This report contains recommendations for eliminating Gaffkya homari, the blood-disease bacterium, from tanks and tidal pounds.

Disinfecting lobster tanks:

(1) Fill tanks and piping system with sea water; when full, stop the water flow.
(2) Add enough calcium hypochlorite to the tank and the pipes to make a 1% chlorine concentration.
(3) Scrub the surfaces of the tank thoroughly with a stiff brush.
(4) After the disinfectant has worked for about 3 hours, drain the tank and the pipes and flush thoroughly with water for from 3 to 6 hours.
(5) Since chlorine is extremely toxic to lobsters, use a chlorine-testing kit to determine residual chlorine before restocking the tank.
(6) Stock disinfected tanks with newly delivered lobsters only; do not move lobsters from untreated tanks to clean tanks.
(7) Use only equipment (such as dip nets and baskets) that has been disinfected.

(over)

9.19 SELECTIVE PREDATION BY NEWTS ON FROG TADPOLES TREATED WITH DDT

Cooke, A. S. (Monks Wood Experimental Station, Abbots Ripton, Huntingdon, Hunts., England)
Nature 229, No. 5282, 275-276 (January 22, 1971)

The behavior of frog tadpoles changes distinctly following the tadpoles' exposure to DDT--at first they swim frantically about lashing their tails and twisting their bodies; next they slowly and persistently swim about in a twisting manner; and finally they become moribund and die. During 100 trials with DDT-treated and control tadpoles, newts caught 10 times as many of the treated tadpoles, probably because of their hyperactivity and therefore conspicuousness. The author theorizes that although pesticide-induced hyperactivity may be a hazard to the individual animal, it could be beneficial to the unexposed population by redirecting predatory activity. However, this type of selective predation could also be harmful if the predator is susceptible to toxin and the prey is relatively resistant. [3 tables, 9 references] LB

9.6 (0.6)(9.12) BETWEEN WORLD TIDES

Glover, R. S. (reviewer)
Nature 229, No. 5284, 431-432 (February 5, 1971)

This review covers two books, both edited collections of papers dealing with marine ecology.

1. Marine Food Chains, edited by J. H. Steele. (Oliver and Boyd: Edinburgh, Scotland, 1970) viii + 552 pp. 100s.

This volume consists of 29 papers (delivered at a symposium in Aarhus, Denmark, in July 1968) covering a specific aspect of marine ecology, the food chain. The papers are grouped into six categories, each introduced by an authority on that particular aspect of the subject: "Recycling of Organic Matter," "Pelagic Food Chains," "Feeding Mechanisms," "Food Abundance and Availability in Relation to Production," and "Theoretical Problems." Many of the papers deal with the terminal yield of the food chain and the significance of yield in fisheries management. It is pointed out that further progress in understanding the ecological efficiency of the food chain will come from increased studies, in the field, of natural, functional populations, for regions and taxonomic groups vary so fundamentally that generalized models will probably be inapplicable to a broad treatment of the problem.

These papers, as symposia should, leave a clear impression of what is not known and of what should be done next. The reviewer considers it a most useful volume for experienced research workers, particularly for those who are planning future research programs.

(over)

9.19 (7.43) ECOLOGICAL CHANGES OF APPLIED SIGNIFICANCE INDUCED BY THE DISCHARGE OF HEATED WATERS

Hawkes, H. A. (Dep. Biol. Sci., Univ. Aston, Birmingham, England)
Chemical Abstracts 73, No. 18, 91016f (November 2, 1970)

9.15 (2.4)(1.87)

As an example of the effectiveness of this procedure, the authors cite their experience in a disease situation. Surveying a tank that had shown heavy losses of lobster, they found G. homari in all 13 water samples taken throughout the system, including in the water flowing into the tank. After disinfection, they could detect no organism in any of the water or slime samples taken from the same locations as before. They recommend routine scrubbing and flushing each time the tank is emptied of lobsters. When water temperatures reach 50° F. and above, the disinfection procedure should be followed.

Disinfecting tidal pounds:

(1) Sprinkle powdered calcium hypochlorite (70%) over the floor of the pound at a concentration of 0.5 lb./100 sq. ft.
(2) Fill the pound with water and allow to stand for 3 days.
(3) Before restocking, thoroughly flush for three tidal exchanges to eliminate residual chlorine.

In a study to test the effectiveness of this procedure, the authors took five mud samples from each of four compartments of a commercial pound. Three of the four compartments, and 50% of the samples, contained G. homari organisms. After disinfection, none of the samples taken from the same places as before showed signs of the bacterium. The authors recommend that tidal pounds be disinfected before they are restocked, or at least once a year. LB

9.14 FOOD VEHICLE FOR ORAL ADMINISTRATION OF PHARMACEUTICALS TO FISH

Tupa, Frantisek, Josef Kral, and Bohumil Sevcik (Spofa, United Pharmaceutical Works)
German Offen. [Patent Application] 2,009,159 (September 10, 1970)
Chemical Abstracts 74, No. 2, 6401f (January 11, 1971)

9.6 (0.6)(9.12)

2. Marine Ecology. A Comprehensive, Integrated Treatise on Life in Oceans and Coastal Waters, edited by Otto Kinne. (Wiley Interscience: London and New York, November 1970) Volume 1, Part 1, ix + 681 pp. 250s.

Volume 1 (titled "Environmental Factors") is the first of five projected volumes intended to review and synthesize existing knowledge of marine life. Succeeding volumes will deal with "Physiological Mechanisms," "Cultivation," "Dynamics," and "Ocean Management." Some of these volumes, also, will have more than one part.

Part 1 of Volume 1 has three chapters: an introductory one on the oceans and coastal waters as life-supporting environments, one on light, and one on temperature. The two latter are each divided according to a standard outline: an introduction, followed by reviews of the responses to light, or temperature, of bacteria, fungi and blue-green algae, plants, invertebrates, and fish, in that order. Within each of these subdivisions, the responses are further subdivided into functional responses (under the following subheadings: tolerance, metabolism, reproduction, and distribution) and structural responses (under size, external structures, and internal structures). Each chapter ends with a comprehensive bibliography; more than 1,800 scientific papers are cited in this first part. LB

9.19 REVIEW OF THE 1969 LITERATURE ON WASTE WATER AND WATER POLLUTION CONTROL. WATER POLLUTION. EFFECTS OF POLLUTION ON FISH LIFE

Katz, Morris, D. E. Sjolseth, Donald R. Anderson, and L. R. Tyner
Chemical Abstracts 73, No. 14, 69575r (October 5, 1970)

9.14 (1.85)

Constituent	Percentage of each constituent in			
	Diet 1	Diet 2	Diet 3	Diet 4
Glucose	24.3	7.8	--	5.6
Sucrose	--	10.0	5.1	10.0
Starch	18.0	18.0	4.0	4.0
Chitin	--	--	4.0	4.0
Glucosamine	--	--	1.5	1.5
Cellulose powder	4.0	4.0	4.0	4.0
Purified soy-bean protein	40.0	40.0	60.0	50.0
Methionine	1.0	1.0	1.0	1.0
Tryptophan	0.2	0.2	0.2	0.2
Amino acid mixture	--	5.0	--	--
Glutamic acid	--	--	0.2	0.2
Glycine	--	--	0.1	0.1
RNA	--	--	0.5	--
Citric acid	--	0.5	0.3	0.3
Succinic acid	--	--	0.3	0.3
Fatty acid mixture	1.2	2.4	--	--
Refined soy-bean oil	--	--	8.0	8.0
Salt mixture	7.7	7.7	7.7	7.7
Vitamin mixture	2.6	2.6	2.6	2.6
Cholesterol	0.5	0.5	0.5	0.5
Morin (3,5,7,2′-4′-pentahydroxyflavone)	0.5	0.3	--	--
*Agar	--	--	4.0	4.0
*Distilled water	70.0	70.0	100.0	100.0

* Added to dietary mixtures before refrigerated storage. LB

9.19 TEST FOR CONTAMINATION
(9.6)(7.49)

Marley, W. G. (reviewer)
Environmental Surveillance in the Vicinity of Nuclear Facilities
William C. Reinig (editor)
Published by Thomas, Springfield, Illinois; July 1970; xvi + 465 pp. $29
Nature 229, No. 5284, 434 (February 5, 1971)

This book contains 46 papers, contributed by authors from 16 countries, that were presented at a symposium of the Health Physics Society in January 1968. It is divided into five parts. The first contains three papers concerned with the objectives of environmental surveillance; much of this part is based on the recommendations of the International Commission on Radiological Protection (Publication Seven, "Principles of Environmental Monitoring"). A rather substantial part is devoted to the design and use of methods of environmental surveillance under normal and emergency conditions. Another part consists of seven papers dealing with the consequences to populations of doses of ionizing radiation, determined from actual experience in the operation of nuclear facilities. One of the papers in this part reviews the recommendations of four international agencies--the International Commission on Radiological Protection (providing fundamental principles and information on the significance of radiation exposure), the International Atomic Energy Agency, the Food and Agriculture Organization of the United Nations, and the World Health Organization (the last three providing good references for radiochemical methods and analyses and for the use of instruments). The fifth part is concerned with research in support of environmental surveillance; data are presented on the behavior of radioactivity in the environment (e.g., of strontium in streams and of tritium in air and soil) and its passage through food chains to man. LB

0.4 MYRMICINE ANTS SECRETE HERBICIDAL CHEMICALS

Anonymous
Chemical & Engineering News 49, No. 5, 39 (February 1, 1971)

West German scientists (Hermann Schildknecht and K. Koob, University of Heidelberg) have isolated and identified a herbicide produced by the glands of leaf cutter ant (Atta sexdens) and the harvester ant (member of the subfamily Myrmicinae that also includes the leaf cutter ant). The leaf cutter ant secretes phenylacetic acid, indolylacetic acid, and ß-hydroxydecanoic acid from its methathoracic glands (the last compound is responsible for herbicidal activity of the secretion). The authors named the herbicide Myrmicine.

The chemical acts as a selective herbicide--it inhibits the growth of bacteria and some fungi but does not affect the fungi on which the leaf cutter ant feeds. The leaf cutter ants not only gather their food for the winter but also cultivate fungi on leaf fragments that they have chewed to make a compost. To maintain their fungus gardens, the ants secrete antibiotics as well as growth-producing substances (such as indolylacetic acid).

The authors think that Myrmicine may possibly be used for preservation of foods. The chemical can be easily synthesized. Recent tests have shown that its herbicidal power is superior to the herbicidal activity of most commonly used food preservatives. [2 illustrations] FTP

9.19 MERCURY CONTAMINATION IN THE NATURAL ENVIRONMENT
(9.6)

Rehfus, Ruth (Bureau of Commercial Fisheries, U.S. Department of the Interior, Ann Arbor, Michigan), Arthur H. Priddy (BCF, U.S. Department of the Interior, Seattle, Washington), and Mildred E. Barnes (Office of Library Services, U.S. Department of the Interior, Washington, D.C.)
Bibliography prepared by the Office of Library Services, U.S. Department of the Interior, Washington, D.C. 20204, 32 pp. (July 1970)

This pamphlet contains a bibliography of 209 references on the English language literature related to environmental contamination by mercury. Primary emphasis was given to material dealing with fish, wildlife, and water pollution within the period of 1960 to date. FTP

This new monthly journal is concerned with rapidly disseminating information about the pollution of the sea by human activities. It carries news of pollution incidents and articles devoted to the latest research into effects of pollution on the marine environment and to the measures being taken throughout the world to counter these effects. It costs $8 a year, delivered by air freight. LB

9.19 MARINE POLLUTION BULLETIN
(9.6)

Macmillan Journals Ltd., Brunel Road, Basingstoke, Hampshire, England)
Chemical Engineering 78, No. 2, 117 (January 25, 1971)

9.12 MIGRATIONS AND GROWTH OF DEEP-SEA LOBSTERS, HOMARUS AMERICANUS
(1.87)

Cooper, Richard A., and Joseph R. Uzmann (Bureau of Commercial Fisheries, Biological Laboratory, West Boothbay Harbor, Maine 04575)
Science 171, No. 3968, 288-290 (January 22, 1971)

Over the past 10 years, stocks of deep-sea lobsters off New England have become an important part of the commercial fishery of the United States. Research is being carried out to establish the degree of interaction between the deep-sea lobsters (occurring to depths of 700 meters) and the endemic populations of the coast of New England.

The lobsters inhabiting the outer Continental Shelf undertake extensive seasonal migrations. The distribution of the recoveries of tagged lobsters demonstrated shoalward migration in spring and summer and a return to the edge of the Continental Shelf in fall and winter. The deep-sea lobsters grow faster than coastal lobsters; growth increments at molting are greater and molting occurs more frequently. [1 figure, 1 table, 17 references] FTP

Many fishes secrete nitrogenous compounds that form mirrorlike layers of reflective crystals. These layers in the scales and in the skin are displays or camouflage; elsewhere the layers aid vision. [illustrated] FTP

9.12 REFLECTORS IN FISHES

Denton, Eric
Scientific American 224, No. 1, 64-72 (January 1971)

9.3 U.N. ADOPTS PRINCIPLES GOVERNING SEABED EXPLOITATION AND DECIDES TO CONVENE COMPREHENSIVE LAW-OF-THE-SEA CONFERENCE IN 1973

Statements by Claiborne Pell (U.S. Representative to the United Nations General Assembly) and by John R. Stevenson (Legal Advisor to the U.S. Department of State and U.S. Representative in Committee I of the U.N. General Assembly)
The Department of State Bulletin 64, No. 1649, 150-159 (February 1, 1971)

This article contains the statements made by Senator Claiborne Pell and by John R. Stevenson in Committee I (Political and Security) of the United Nations General Assembly, together with the texts of Resolutions Adopted by the Committee on December 15 and 16 and by the General Assembly on December 17, 1970, relating to principles governing seabed exploitation.
[8 footnotes] FTP

9.19 MERCURY IN FISH
(8.42)

Johnels, Alf G., Mats Olsson, and Torbjorn Westmark (Statens Inst. Folkhalsan, Stockholm, Sweden)
Chemical Abstracts 73, No. 9, 44023w (August 31, 1970)

Subject	Page	Code
ANALYSIS, GENERAL		
Evaporation of DDT	26	7.9
ANALYSIS, ORGANIC		
Characterization of Oil Slicks on Surface Waters	19	7.9
ANTIOXIDANTS		
Effect of Ethoxyquin on the Longevity of C3H Mice	21	4.6
APPARATUS AND EQUIPMENT		
Solder Glasses	1	0.111
[A Simple Apparatus for Studying the Behavior of Oysters...]	1	0.119
Introduces New-Generation Processor	1	0.12
New Method for Measuring Density of Seawater	2	0.114
Membrane Ultrafiltration Applications in Food Processing. 1...	2	0.116
New Way to Fabricate Meats	15	3.231
AUTHOR INDEX		
BACTERIOLOGY		
The Bacteriology of 'Scampi'...I. Preliminary...Studies	13	2.01
BYPRODUCTS, MISCELLANEOUS		
Hydrogenation of...Fatty Esters With Copper-Chromite Catalyst...	21	6.138
Hydrogenation of...Oils With Platinum Metal Group Catalysts	21	6.138
...Isomerization During Partial Hydrogenation of Trilinolein...	22	6.138
Manufacture of Frankfurter-Type Sausages	23	6.54
Control of Dry Sausage Ripening	24	6.54
Modern Dry Sausage Manufacture	24	6.54
Search for Methods for Removing Urea From Shark Meat	24	6.59
Fish Scrap Offers High Quality Protein	25	6.54
CANNED FISH, GENERAL		
...Mechanism of Blue Discoloration of Canned Crab Meat		
IV. Spectrophotometric Study of Blue Meat	17	3.3344
V. Isolation of Causative Substance of Blue Meat	17	3.3344
VI. ...Copper and Sulphide Reaction in Heat-Coagulated Haemocyanin	18	3.3344
CANNED FISH, PROCESSING		
Processing Loss in Rolled Meat Products	17	3.335
CHEMISTRY AND BIOCHEMISTRY		
Studies on Myofibrils From the Stored Muscle. Part I...	1	0.32
Circular Dichroism and...[EPR] of the Haptoglobin-Hemoglobin Complex	2	0.32
Seasonal Composition...Plankton Communities: Fatty Acids	3	0.31
...Carnosine, Anserine, and Balenine in the Muscle of Animal	3	0.320
...Muscle Protein Polymorphism Occurring Within the Genus Tilapia	3	0.321
...Aseptic Autolysis of the Muscle of Mackerel	3	0.322
Lactate and Malate Dehydrogenase Isozyme Patterns in Fish...	3	0.38
Proteolytic Enzymes in Sea Urchin Eggs...Before and After Fertilization	4	0.38
Total ß-Activity of Ocean Fish	4	0.39
Studies on the Esterase and Lipase of Fish. III...Fish Muscle	5	0.38
DDT Movement...to Muscle Cell During Lipid Utilization	5	0.39
Lysosomal Cathepsins of Chicken Skeletal Muscle...	6	0.38
...Generic Descriptors and Trivial Names for Vitamins and Related Compounds	26	7.6
Myrmicine Ants Secrete Herbicidal Chemical	29	0.4
COMPOSITION, INORGANIC		
Trace Minerals in Type A School Lunches	25	8.42
COMPOSITION, ORGANIC		
Atrinine, a New Betaine Isolated From the Adductor Muscle of Fan-Mussel	26	8.59
CRAB		
Red Crab, Geryon quinquedens		
1- Recommended Live Storage Temperature	11	1.86
2- Resistance to Gaffkemia, the Lobster Disease	11	1.86
ECONOMICS		
The Concept of the Marginal Yield From Exploited Fish Stocks	26	9.2
ENGINEERING		
Miniplant Design and Use	7	0.8
Useful Energy From Unwanted Heat	7	0.8
Putting Sound-Waves to Work	9	0.8

Subject	Page	Code
FROZEN FISH, CHANGES IN DURING COLD STORAGE		
...Denaturation of...Proteins...I. Preventive Effect of Na-Glutamate	17	3.2495
...Behavior of Frozen Cod Muscle Stored Near Its Melting Point	18	3.2495
FROZEN FISH, PROCESSING		
Refrigerated Container (pat.)	16	3.231
Fish Freezing by Immersion in Calcium Chloride Brine	16	3.2342
Improvements in or Relating to Cooling or Freezing Processes (pat.)	16	3.2342
Food Freezing Process (pat.)	16	3.2344
Vacuum Drying (pat.)	16	3.2349
...Thawing and...the Immediate and Refrozen Storage Quality of Fish	18	3.27
Rapid Thawing Process for Block Frozen Fish	18	3.27
Thawing by Microwaves	18	3.27
GEAR, FISHING		
Dutch Twin Boom Trawling	13	2.1121
Maine Agency Draws Plans for Shrimp Traps	13	2.1128
Leaflet is Available on Tricky Job of Cutting Web Tapers	14	2.1112
HANDLING FRESH FISH		
Fish Gutting Apparatus (pat.)	14	2.3
...Treatment of Wastes From Fish Meat Manufacture	14	2.3
Shellfish Processing (pat.)	14	2.3
Shrimp Processing (pat.)	14	2.3
Conditioned Water-Habitat...Shipping...Keeping Live Fishes (pat.)	14	2.5
Bone-Free Fish Fillets (pat.)	15	2.3
Fish Cleaning Apparatus (pat.)	15	2.3
Fish Cooking (pat.)	15	2.3
LOBSTERS		
Disease Among Stored Lobsters (Gaffkemia)	11	1.87
MACKEREL		
Seasonal and Geographic Characteristics of...Pacific Mackerel	10	1.11
NEW PRODUCT		
Fish Derived Seasoning (pat.)	19	3.9
NORTH AMERICAN FISHERIES, INLAND		
Freshwater Fish -- Pollution by Introduction	9	1.011
NUTRITION AND MEDICINE, GENERAL		
Toxicological Evaluation of Some Food Colors...Other Substances	7	0.7
Dietary Regulations and Food Habits of Muslims	8	0.7
Food Habits of Infants and Preschool Children in Surinam	8	0.7
NUTRITIONAL VALUE OF FISHERY PRODUCTS OTHER THAN MEAL		
Effect of Protein and Fat Levels...on the Growth of Mink Kits	23	6.52
OILS, CHEMICAL AND PHYSICAL PROPERTIES		
Evaluation and Analysis of Frying Fats. II.	20	4.11
...The Electron Microscopic Examination of Fats	20	4.11
...Determination of Fatty Acid Constituents of Lipids...	20	4.11
Mass Spectrometry of Glyceryl Ether Diesters	20	4.2
Antioxidative Effect of Kojic Acid Derivatives. I...	22	4.21
Peroxides. 1. Oxidation, Decarboxylation, and Rancidity	22	4.21
OYSTERS		
...Possible Causes of Mortality of Oyster Larvae...in Tomales Bay...	2	1.81
PERIODICALS AND BOOKS		
Between World Tides	27	9.6
POLLUTION		
Ecological Changes...Induced by the Discharge of Heated Waters	27	9.19
...Predation by Newts on Frog Tadpoles Treated With DDT	27	9.19
...Literature on...Water Pollution. Effects of...on Fish Life	28	9.19
Test for Contamination	28	9.19
Marine Pollution Bulletin	29	9.19
Mercury Contamination in the Natural Environment	29	9.19
Mercury in Fish	29	9.19
PRESERVATION, IRRADIATION		
Effect of γ-Irradiation on Beef Myoglobin	15	3.15
Effect of [γ]-Irradiation on Carbonyl Compounds and Free Amino Acids...	16	3.15
Improvements in or Relating to Microwave Heating (pat.)	16	3.15

EUROPEAN FISHERIES, U.S.S.R.
Soviet Approach to Crew Safety 9 1.0145
EXPLORATORY FISHING
Trials With a Transponding Acoustic Fish Tag... 13 2.12
FISH CULTURE
Requirement of Young Carp for α-Tocopherol 25 9.14
Nutritional Requirements of Prawn...on Artificial Diet 27 9.14
Food Vehicle...Oral Administration of Pharmaceuticals to Fish (pat.) 28 9.14
FISH MEAL, NUTRITIVE VALUE
Effect of...Species and Production Process on...Quality of Fish Meals 22 6.190
...Poultry Congress...Evaluation of...Feed Ingredients 23 6.195
Protein Quality of Differently Prepared Fish Meals... 24 6.195
FISH MEAL AND OIL, MANUFACTURE
Fats and Oils -- Distillative Deacidification 22 6.133
FISH PROTEIN CONCENTRATE
Enzymatic Solubilization of [FPC]...Continuous Enzyme Recycling Processes 23 6.54
Fish Protein Concentrates (pat.) 24 6.54
FISHERY BIOLOGY AND ICHTHYOLOGY
Migrations and Growth of Deep-Sea Lobster, Homarus americanus 29 9.12
Reflectors in Fishes 29 9.12
FOOD TECHNOLOGY
Heavy Organic Chemicals and Food Groups 5 0.6
Volatile Flavoring Substances in Foodstuffs 5 0.6
Meat Product Manufacture 6 0.6
Physical Properties of Plant and Animal Materials 6 0.6
Rheology of Minced Meat During Chopping 6 0.6
Studies on Utilization of Amino Acids for Foodstuffs
III. Effects...on...Frozen Fish Meat Paste and Fish Meat Sausage 7 0.6
IV. Amino Acids as a Meat Emulsifying Agent 8 0.6
The Disposal of Wastes in the Chemical Industry 8 0.8
Staphylococci Control and the Food Processor 12 2.3
FRESHNESS OF FISH
...Freshness of Fish...Nucleic Acids and Their Related Compounds 4 0.33
FROZEN FISH, GENERAL
Fish Preservation (pat.) 15 3.2349
Frozen Fish Fillets (pat.) 15 3.2349
Jellied Fish Product (pat.) 15 3.2349
PRESERVATIVES
Effect of Brining and Polyphosphate on Yield and Quality 16 3.12
Health Aspects...Polyphosphate Utilization...Meat Industry 16 3.12
QUALITY CONTROL
Sensory Evaluation of Food 25 7.80
Microbial Flora of Gulf of Mexico and Pond Shrimp 25 7.85
Quality Indices That Can Be Used to Assess Irradiated Seafoods 26 7.80
...Determination of Isopropanol in Fish Protein Concentrates 26 7.89
Green Discoloration of Ship-Frozen Fillets of Fish Varieties 26 8.8
RANCIDITY
Effects of Model System...on Autoxidation of Methyl Linoleate 19 4.5
REGULATION AND INSPECTION
U.N. Adopts Principles Governing Seabed Exploitation and Decides to Convene Comprehensive Law-of-the-Sea Conference in 1973 29 9.3
SALMON
The Carrying Capacity for Juvenile Salmonids in Some...Streams 11 1.30
SALT FISH
Dry Salted Fish Product (pat.) 19 3.5
SANITATION
...Control of Blood Disease (Gaffkemia) in Lobster Storage Facilities 27 9.15
SHRIMP
[The Deep-Sea Prawn (Pandalus borealis) in the Northwest Atlantic] 12 1.85
SMOKED FISH
Liquid Smokes for Use in Cured Meats 17 3.4
...Polycyclic Aromatic Hydrocarbons in Liquid Smoke Flavors 19 3.4
Smoke Flavor Compositions (pat.) 20 3.4
SOUTH AMERICAN FISHERIES
Marketing and Consumption of Fish Products in Bogotá 9 1.013
SPOILAGE
Rigor Tensions and Gaping in Cod Muscle 11 2.0
Autoxidative Deterioration of Fats 21 6.138
VITAMINS, MISCELLANEOUS
Effect of Freezing on Oxidation of L-Ascorbic Acid 22 5.5
WORLD FISHERIES
Antarctic Ecosystems 10 1.01

Author	Page	Code
Abe, Yoshiro	22	4.21
Ahern, Michael	23	6.54
Amano, Keishi	26	8.8
Anderson, Donald R.	28	9.19
Aoki, S.	23	6.52
Ballinger, Dwight G.	19	7.9
Barnes, Charles J.	19	3.4
Barnes, Mildred E.	29	9.19
Bazarova, K. I.	17	3.4
Berg, Carl J., Jr.	2	1.81
Bito, Masamichi	26	8.8
Bock, H. D.	24	6.195
Bozhkov, Dobrin	4	0.39
Bregman, J. I.	7	0.8
Brewer, Martin	13	2.1128
Browning, Jon E.	9	0.8
Burns, James W.	11	1.30
Burt, J. R.	11	2.0
Caldwell, Kathryn A.	6	0.38
Cann, D.	13	2.01
Carver, J. H.	25	6.54
Chambers, Edward L.	4	0.38
Cheftel, Claude	23	6.54
Chen, Yen-Nan	26	8.59
Cinadr, Bernard F.	7	0.8
Cirilli, Giovanni	22	4.21
Clarke, Reginald	15	3.15
Comfort, A.	21	4.6
Cooke, A. S.	27	9.19
Cooper, Richard A.	29	9.12
Cornick, John W.	11	1.86
--	11	1.87
--	27	9.15
Couch, J. R.	23	6.195
Curley, Jerome K.	7	0.8
Dalcq, P.	16	3.2342
Dambergs, N.	26	7.89
Dazai, M.	14	2.3
De Boer, E. J.	13	2.1121
De Figueiredo, Mario P.	12	2.3
DeFreitas, A. S. W.	5	0.39
Denton, Eric	29	9.12
Drake, B.	25	7.80
Dubois, G.	8	0.7
Dyer, William J.	16	3.12
Ehira, Shigeo	4	0.33
Elich, A.	15	2.3
Evans, G. H.	5	0.6
Farrin, Afton	13	2.1128
Fennema, Owen	22	5.5
Fenters, W.	15	3.231
Ferrier, B.	8	0.7
Findlay, G. M.	5	0.39
Fontaine, Bernard	12	1.85
Fujimaki, Masao	1	0.32
--	16	3.15
Glover, R. S. (rev.)	27	9.6
Gorbatov, V. M.	17	3.4
Gorbatow, A. W.	6	0.6
Gorbatow, W. M.	6	0.6
Gorton, T. S. (pat.)	14	2.3
Grosjean, Ok-koo K.	6	0.38
Gulland, J. A.	26	9.2
Hamada, Iwao	20	4.11
Hasegawa, J.	23	6.52
Hawkes, H. A.	27	9.19
Hayashi, Masami	20	4.11
Heidelbaugh, Norman D.	19	4.5
Herrmann, U.	24	6.195
Hibiya, Takashi	25	9.14
Hines, R.	3	0.321
His, Edouard	1	0.119
Hogan, Raymond E.	1	0.111
Holdgate, M. W. (ed.)	10	1.01
Howard, John W.	19	3.4
Idler, D. R.	18	3.27
Inoue, Norio	17	3.3344
--	18	3.3344
Itoyama, K.	23	6.52
Jeffries, H. Perry	3	0.31
Jewell, G. G.	20	4.11
Jobmann, P.	15	2.3
Johannesson, R. (pat.)	14	2.3
Johannson, B.	25	7.80
Johnels, Alf G.	29	9.19
Jones, J. M., Jr.	14	2.3
Jones, N. R.	11	2.0
Kanazawa, Akio	27	9.14
Karel, Marcus	19	4.5
Karmas, E.	6	0.6
Kashiwada, Ken-ichi	27	9.14
Katz, Morris	28	9.19
Kawahara, Fred K.	19	7.9
Kawakami, Ken	7	0.6
--	8	0.6
Kawasaki, Mitsuyasu	27	9.14
Khlamova, R. I.	17	3.4
King, F. J.	25	6.54
Kinne, Otto (ed.)	28	9.6
Kirschner, E.	22	6.138
Koizumi, Chiaki	3	0.322
Kolonics, Z.	8	0.8
Kon, Hideo	2	0.32
Konosu, Shoji	26	8.59
Koritala, Sambasivarao	21	6.138
Kotter, L.	23	6.54
Kral, Josef	28	9.14
Kramer, David	10	1.11
Kreienbring, F.	24	6.195
Kremling, K.	2	0.114
Krischer, Kenneth N.	4	0.38
Krylova, N. N.	17	3.4
Kumeno, F.	23	6.52
LeTellier, Paul R.	20	4.2
Libenson, C. M. (pat.)	24	6.54
Liebing, H. A.	22	6.133
Linke, H.	17	3.335
Lloyd-Jones, C. P.	26	7.9
Love, R. Malcolm	18	3.2495
Lowrey, E. R.	22	6.138
Lyaskovskaya, Yu. N.	17	3.4
MacCallum, Wallace A.	18	3.27
Maggillavry, Ch. J.	8	0.7
Maier, Hans Gerhard	5	0.6
Makinen, Marvin W.	2	0.32
Manita, Hideaki	3	0.322
Mankel, A.	20	4.11
Marley, W. G. (rev.)	28	9.19
Maruyama, Michie	3	0.320
Matsumoto, Juichiro J.	17	3.2495
McGill, A. S.	11	2.0
Meara, M. L.	20	4.11
Meisel, M. N.	18	3.27
Meredith, R. J.	16	3.15
Michaels, A. S.	2	0.116
Misono, T.	14	2.3
Mitson, R. B.	13	2.12
Miyake, Masato	7	0.6
--	8	0.6
Miyauchi, David T.	26	7.80
Mohsenin, Huri N.	6	0.6
Morishita, Tatsuo	5	0.38
Morita, Makio	16	3.15
Motohiro, Terushige	17	3.3344
--	18	3.3344
Mroz, E.	25	7.85
Murphy, Elizabeth W.	25	8.42
Nakamura, T. (pat.)	19	3.5
Nawar, Wassef W.	20	4.2
Nelson, Donald	13	2.1128
Newbould, P. J. (rev.)	10	1.01
Nickelson, R.	25	7.85
Noguchi, Satoshi	17	3.2495
Nonaka, Junsaku	3	0.322
Numachi, Ken-ichi	3	0.38
Ogawa, M.	14	2.3
Ogino, Chinkichi	25	9.14
Okitani, Akihiro	1	0.32
Olsson, Mats	29	9.19
Page, Louise	25	8.42
Pathmanathan, K.	21	4.6
Pell, Claiborne	29	9.3
Pelroy, G.	26	7.80
Petrovic, Ivan	16	3.12
Pezacki, W.	24	6.54
Porter, M. C.	2	0.116
Priddy, Arthur H.	29	9.19
Proewig, Frederick W.	14	2.5
Purr, A.	21	6.138
Redfern, R.	1	0.12
Regier, L. W.	26	7.89
Rehfus, Ruth	29	9.19
Reinig, William C. (ed.)	28	9.19
Reuter, H.	24	6.54
Richards, James F.	15	3.15
Rinaldo, Ronald G.	13	2.1128
Roepke, K.	24	6.195
Rylander, Paul N.	21	6.138
Saito, Kaoru	3	0.320
Sakr, Ahmad H.	8	0.7
Sandri, Mauro	22	4.21
Schiller, Klaere	22	6.190
Schooley, Arthur T.	7	0.8
Schulz, Edgar	22	6.190
Semyonov, Igor M.	9	1.0145
Sevcik, Bohumil	28	9.14
Shewan, J. M.	13	2.01
Shimaya, Makoto	27	9.14
Shudo, A. (pat.)	15	2.3
Shudo, N. (pat.)	15	2.3
Sjolseth, D. E.	28	9.19
Skachkov, V. P.	24	6.59
Smith, Paul E.	10	1.11
Spinelli, John	26	7.80
Steele, J. H. (ed.)	27	9.6
Stevenson, John R.	29	9.3
Stewart, James E.	11	1.86
--	11	1.87
--	27	9.15
Storeton-West, T.	13	2.12
Stroud, G. D.	11	2.0
Suyama, Michizo	3	0.320
Suzuki, Takeshi	3	0.320
Tajima, Makoto	16	3.15
Takahashi, Takashi	5	0.38
Takahashi, Yukio	22	4.21
Takashima, Fumio	25	9.14
Tanaka, Akiko	7	0.6
--	8	0.6
Tannenbaum, Steven R.	23	6.54
Thompson, Lilian Umale	22	5.5
Thompson, S. S. (pat.)	16	3.2342
Tiggelman-Krugten, V. A. H.	8	0.7
Todorov, Ivan	4	0.39
Tominaga, N. (pat.)	19	3.9
Tupa, Frantisek	28	9.14
Tyner, L. R.	28	9.19
Uchiyama, Hitoshi	4	0.33
Uzmann, Joseph R.	29	9.12
Vanderzant, C.	25	7.85
Van Staveren, W. A.	8	0.7
Venno, Paul M. W.	13	2.1128
Vergara G., Nizar E.	9	1.013
Volovinskaya, V. P.	17	3.4
Walker, M. Greer	13	2.12
Walker, P.	13	2.01
Wang, Daniel I. C.	23	6.54
Watanabe, Katsuko	26	8.59
Watanabe, Takeshi	25	9.14
Watt, Bernice K.	25	8.42
Westmark, Torbjorn	29	9.19
Westrom, R. T. (pat.)	14	2.3
White, Richard H.	19	3.4
Wuensche, J. W.	24	6.195
Yakovleva, G. Ya.	17	3.4
Yang, Ryung	1	0.32
Yashouv, A.	3	0.321
Yeh, Cheng P.	19	4.5
Youhotsky-Gore, I.	21	4.6
Ziemba, John V.	15	3.231

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